

**Uninterruptible Power System (UPS)**

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**TOSNIC-7000S**

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**Instruction Manual (OPERATION)**

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**REQUIREMENT**

- This manual should be delivered to the persons who will ultimately use and maintain the UPS.
- Read this manual carefully before operating the UPS.
- Store the manual in a safe place so it can be referred to when needed.

**July 1999**

**Definitions****(1) Main unit**

① UPS: Uninterruptible Power System

\* If required by the custom specifications, the unit will be marked as a CVCF device.  
CVCF: Constant Voltage Constant Frequency

**(2) Main circuit switches**

① MCCB: Molded Case Circuit Breaker

② ACB: Air Circuit Breaker

**(3) Storage cells**

① Individual battery system: A parallel UPS system in which there is a battery for each UPS in the system.

② Shared battery system: A parallel UPS system in which there is a single battery for all UPS units in the system.

③ HS: Vent type stand-alone lead storage battery

④ AHH: Sintered electrode type alkaline storage battery

⑤ MSE: Sealed stand-alone lead storage battery

**(4) Display**

① Graphic display panel: Includes push buttons, display lamps, and the LCD panel used to display UPS operating procedures and the UPS state.

② LCD: Liquid Crystal Display. This shows the operational procedure and the status of the UPS unit.

③ LED: Light-Emitting Diode. Individual lamps located on the graphic display panel indicate the status of the UPS unit.

④ Scroll buttons: The  $\Delta$  and  $\nabla$  buttons are used to scroll through the LCD screens, from the first screen to the last screen and then back to the first screen (or backward from the last screen to the first screen and then back to the last screen).

**(5) Control system**

① Synchronized mode: Indicates that the UPS output phase is synchronized with either a Dual clock, a bypass, or a free-running clock.

**Notices**

1. Be sure to read this manual before use and have a good understanding of the equipment.  
Store it nearby where it can be referred to when needed.
2. Unauthorized copying of this manual in part or in its entirety is strictly prohibited.
3. Every effort has been made to ensure that the information in this manual is correct and accurate in all respects. If you note inconsistencies or omissions, or if you have any questions, please contact the Toshiba Service Center.

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# 1. Introduction

This manual is designed to ensure the safe and correct operation of the TOSNIC-7000S Uninterruptible Power System (hereafter referred to as "UPS unit"). Please read the "Safety Precautions" and "Operation" sections of this manual carefully before use and make sure you have a thorough understanding of the information in these two sections. Keep the manual handy in a place near the unit so you can refer to it instantly when needed.



Note that this manual was written based on the standard circuits shown in figures 6.2 (page 13). The delivered UPS system may, if desired by the customer, differ from the standard configuration. Similarly, the displayed markings may differ from those on the standard system. If this is the case, follow the operating procedures and indications provided in the development circuit diagrams created individually for the UPS system actually delivered.

Also, while this manual uses the term UPS, the equipment may be marked "CVCF" according to customer specifications. If this is the case, remember that the term UPS in the manual is equivalent to CVCF.

## 2. Safety Precautions



This manual and the labels on the UPS main unit contain important information designed to ensure that the UPS unit is used correctly and safely and prevent property loss and injury to operators and maintenance personnel. Operators and maintenance personnel should follow all precautions noted in the manual and should have a thorough understanding of the meaning of the safety signs and safety symbols shown below.

### Safety signs

| Safety sign  | Meaning   |
|--|---|
|  <b>WARNING</b> | Indicates that failure to observe proper handling procedures may result in death or serious injury    |
|  <b>CAUTION</b> | Indicates that failure to observe proper handling procedures may result in injury* or property damage |

\* Here "injury" refers to burns, electrical shock or other injuries that do not require hospitalization or long-term medical care.

### Safety symbols

| Safety symbol   | Meaning  |
|---|--|
|  | <b>PROHIBITED</b><br>The exact nature of what is prohibited is indicated in pictorial or text form in or near the symbol |
|  | <b>MANDATORY</b><br>The exact nature of what must be done is indicated in pictorial or text form near the symbol.        |

**2. Safety Precautions (continued)****Use**

**Special considerations (\*) are required when using equipment that affects the lives and safety of human beings (\*\*) or has a critical effect on maintaining public services (\*\*\*). Be sure to contact Toshiba in such cases. The use of such equipment without special consideration may result in serious accidents.**

- \*** Means holding through consultations with system designers regarding system operation and management and building a backup system for use in the event of UPS failure.
- \*\***
  - Operating room equipment
  - Life support equipment (artificial dialysis, incubators, etc.)
  - Noxious gas or smoke eliminators
  - Equipment that must be provided under fire laws, construction standards or other ordinances
  - Equipment equivalent to the above
- \*\*\***
  - Equipment used to supervise or control airways, railways, roads, sea lanes or other transportation routes
  - Equipment used to control nuclear power plants, etc.
  - Equipment used to control communications
  - Equipment equivalent to the above

**Warranty**

**The warranty on this product may not cover all primary, secondary or tertiary damage resulting from error or failure of this unit, connected units or software.**

**Checking Warning Labels**

**Check to make sure that warning labels are displayed in the appropriate places (see page 6).**

**If labels are not present or are smudged and therefore illegible, contact the Toshiba Service Center .**

## 2. Safety Precautions (continued)

**WARNING**

**If the unit begins to emit smoke or strange odors, immediately turn off circuit breakers 52R and 72B.**

Continued use may result in fire. Contact the Toshiba Service Center.

**MANDATORY**

**Contact the Toshiba Service Center in the event of malfunction or failure.**

This unit should be repaired only by authorized Toshiba service personnel. Servicing by untrained personnel may increase the scale of the failure or result in electric shock or injury.

**MANDATORY**

**Do not attempt to modify or move the unit yourself or to have this done by a third party.**

Electric shock, injury or failure may result if persons other than specially trained Toshiba technicians attempt to modify or move the unit.

Be sure to contact Toshiba if you wish modifications to be made or if you wish to move the unit.

**PROHIBITED**

**Only open the front panel when performing necessary operations.\***

Operating parts and high-voltage areas inside the UPS have been provided with covers as a safety precaution. Still, touching areas other than those that must be touched to perform necessary operations may result in electric shock, burns or other injuries.

- \* In this case, "necessary operations" means operating circuit breakers/auxiliary switches and inserting/removing memory cards

**MANDATORY**

## 2. Safety Precautions (continued)

**WARNING****Do not open the rear door.**

The parts inside carry high voltage. Touching them may result in electric shock, burns or failure.

**PROHIBITED****CAUTION****Operators should be qualified\* personnel.**

Operation of the UPS by unqualified or untrained personnel may result in electric shock, injury or failure.

- \* In accordance with customer stipulations

**MANDATORY****Make sure the air vents on the front and top of the unit are not blocked.**

Blocking the vents will cause the temperature inside the unit to rise and may result in fire or unit failure.

**PROHIBITED****Make sure you understand the meaning of the warning labels on the equipment, and follow the precautions indicated.**

Operating the equipment with an inadequate understanding of these matters may result in electric shock or burns.

- See Page 6 for the location of these warning labels.

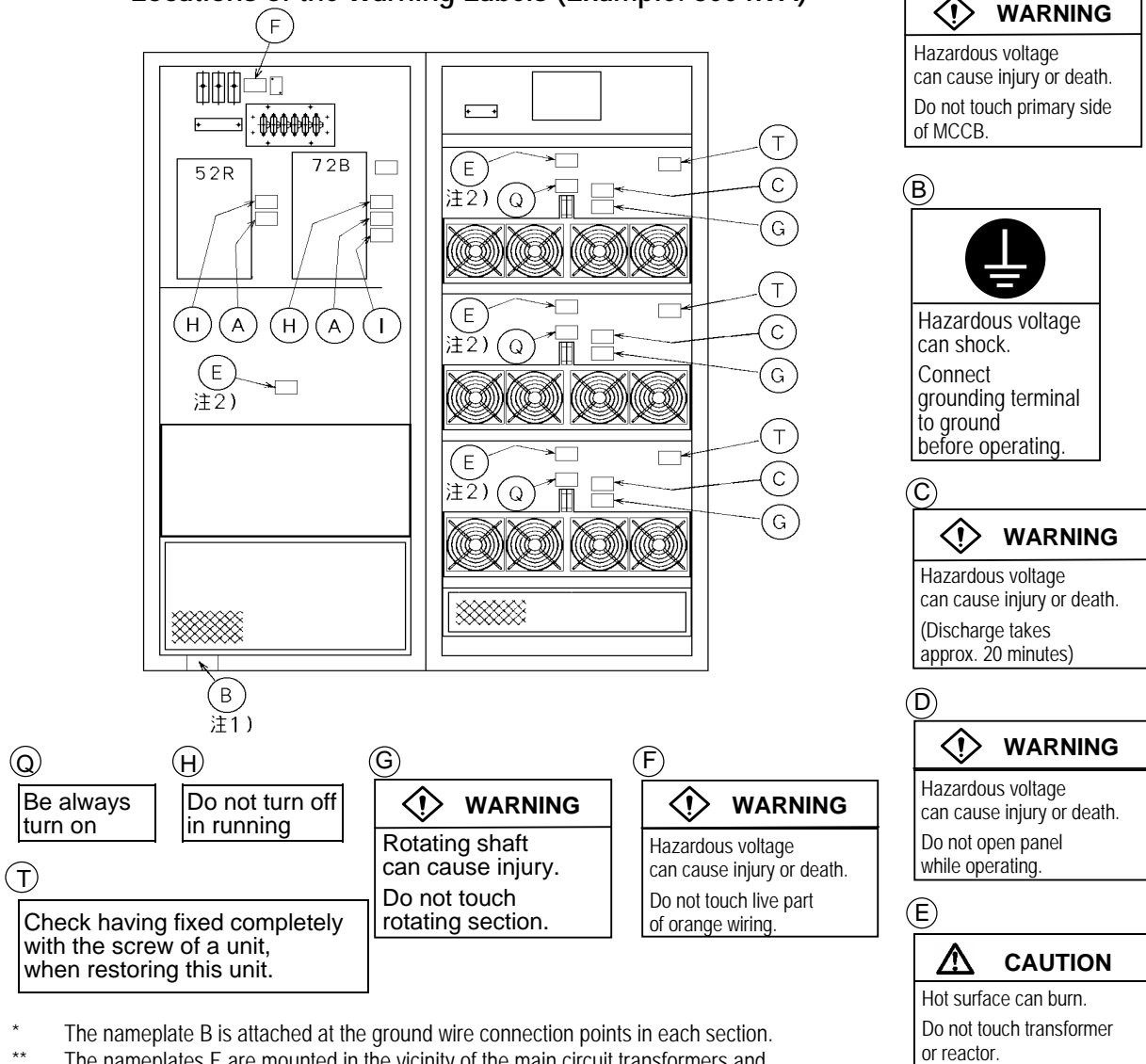
**MANDATORY**

## 2. Safety Precautions (continued)

## Checking warning labels

- (1) The locations of the warning labels on the UPS are shown in Figure 2.1. Check to make sure that these warning labels are in place.  
Note that the placement and content of the warning labels may differ depending on the capacity of the UPS. Verify the locations by referring to the warning label placement figure provided with the "Maintenance & Inspection 6F3H1002" manual.
- (2) Read all warning labels and make sure you understand their meaning.
- (3) Make sure warning labels are always legible. Do not allow them to become smudged and do not remove or cover them up.

### Locations of the Warning Labels (Example: 300 kVA)



**Figure 2.1 Unit Interior Front (with front panel open) and Warning Labels (Example)**

### 3. Handling Precautions

**Perform daily and periodic inspections as noted in the maintenance and inspection plan.**

In order to ensure a long service life and optimal performance, the equipment must be installed in a suitable environment, must be operated correctly, and must be given the proper daily and periodic inspections. Maintenance and inspections are particularly effective in preventing accidents caused by changes in components that will occur over time. Be sure to have periodic maintenance work and inspections done by Toshiba service and maintenance personnel.  
For more information on servicing programs and fee options, contact the Toshiba Service Center.

**Operate the unit within the ambient conditions noted in the specifications.**

Operating the unit outside these ranges may result in failure.

**During operation, do not turn off the air conditioner for the UPS chamber and the battery chamber.**

This will cause the temperature in these chambers to rise and may result in failure.



**PROHIBITED**

**When starting or stopping the equipment, monitor the operation on the graphic display panel LCD and follow the procedures described in Chapter 8 "Operation".**

Operating the unit in other than the prescribed manner may result in failure.

- \* The startup and stop procedures presented in this instruction manual are the operating procedures for independent UPS nits. For system-wide operating procedures for when other distribution panels are present, refer to the corresponding operating procedures manual.



**3. Handling Precautions (continued)**

**Do not turn the circuit breakers ON when control power source switch (8A) is OFF.**

This may result in failure.

Certain units also have a control power source switch (8D).

This switch has the same functions as the switch 8A.



**PROHIBITED**

**Do not turn the control power source switch (8A) to the OFF position when the circuit breakers are ON.**

This may result in failure.

Certain units also have a control power source switch (8D).

This switch has the same functions as the switch 8A.



**PROHIBITED**

**When operating the keys on the graphic display panel, hold down the key for at least 0.5 second.**

The operation may not be performed if the key is held down for shorter periods of time.

**When operating the reset key on the graphic display panel, hold down the key for at least 5 seconds.**

The reset operation may not be performed if the key is held down for shorter periods of time.

**3. Handling Precautions (continued)**

**When the unit has stopped due to failure, be sure to remove the memory card before resetting the LCD Failure Error screen on the panel.**

Resetting (restarting) the UPS without removing the memory card will delete the data needed to determine the cause of the failure.

**Do not leave the unit for long periods of time (1 week) with control power source switch (8A) in the OFF position.**

This can cause the backup capacitor on the control board to become discharged and result in incorrect time display and other problems.





**PROHIBITED**

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## 5. Appearance

|  |   |
|--|---|
|  <b>WARNING</b> | <p><b>Only open the front panel when performing necessary operations.*</b></p> <p>Operating parts and high-voltage areas inside the UPS have been provided with covers as a safety precaution. Still, touching areas other than those that must be touched to perform necessary operations may result in electric shock, burns or other injuries.</p> <p>* In this case, "necessary operations" means operating circuit breakers/auxiliary switches (6CH/8A) and inserting/removing memory cards</p> <p><b>Do not open the rear door.</b></p> <p>The parts inside carry high voltage. Touching them may result in electric shock, burns or failure.</p> |
|--|---|

|  |  |
|--|--|
|  <b>CAUTION</b> | <p><b>Make sure the air vents on the front and top of the unit are not blocked.</b></p> <p>Blocking the vents will cause the temperature inside the unit to rise and may result in fire or unit failure.</p> |
|--|--|

### Example: 300 kVA

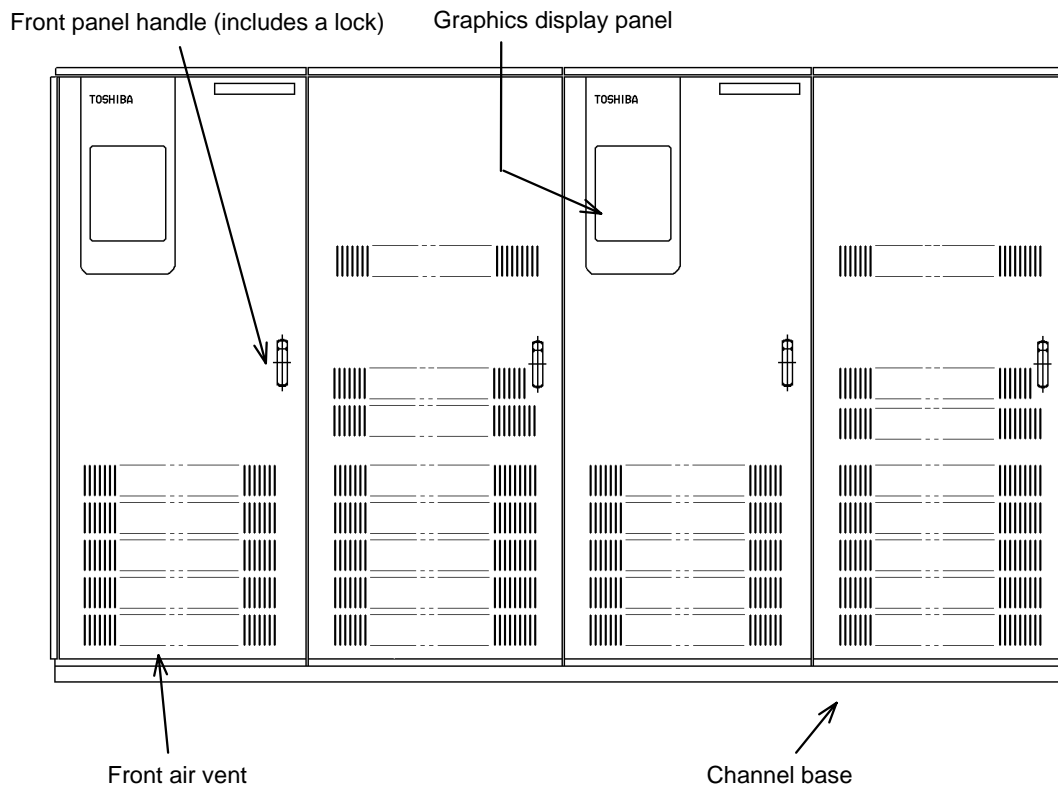


Figure 5.1 Unit Exterior (front)

\* This is an example of the appearance of a standard configuration unit (300 kVA) UPS. In some cases, depending on system configuration, an additional panel may be

## 6. Controls and Circuit Configuration

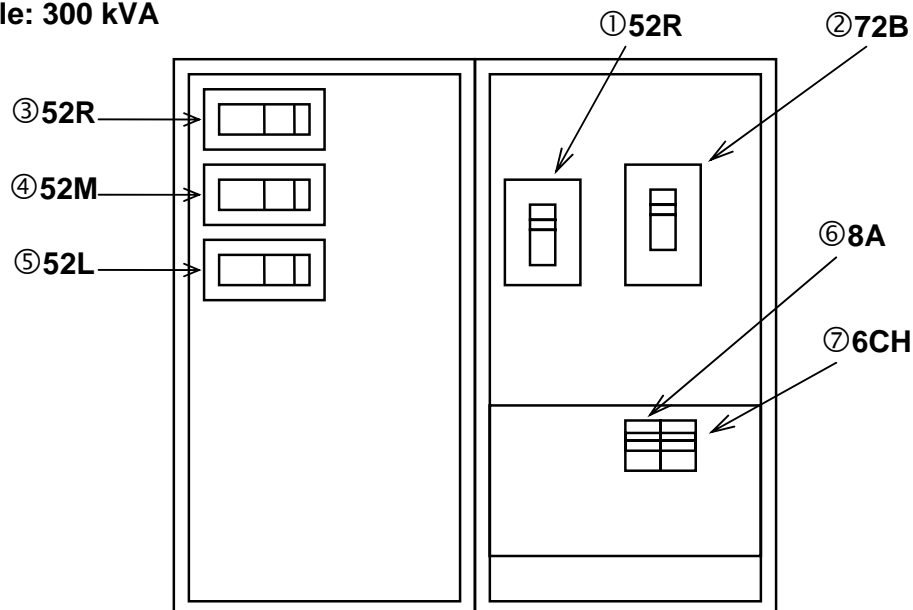
|                         |   |
|-------------------------|---|
| <p><b>⚠ WARNING</b></p> | <p><b>If the unit begins to emit smoke or strange odors, immediately turn off circuit breakers 52R and 72B.</b></p> <p>Continued use may result in fire. Contact the Toshiba Service Center .</p> |
|-------------------------|---|

### 6.1 Panel Controls

Figure 6.1 and Table 6.1 show the locations and functions of the controls used for the circuit configurations (see Figures 6.2) on the UPS.

|                     |  |
|---------------------|--|
| <p><b>NOTES</b></p> | <p><b>Do not turn the circuit breakers ON when control power source switch (8A) is OFF.</b></p> <p>This may result in failure.</p> <p><b>Do not turn the control power source switch (8A) to the OFF position when the circuit breakers are ON.</b></p> <p>This may result in failure.</p> <p>* Certain systems are also provided with a control power source switch (8D).</p> <p>This switch has the same functions as the switch 8A.</p> <p><b>If an MCCB with auxiliary handles is used as the circuit breaker, use the auxiliary handles during operation.</b></p> |
|---------------------|--|

**Example: 300 kVA**



The figure above is only an example; the layout may be different depending on capacity and system configuration.

**Figure 6.1 Location of Control (in panel)**

Table 6.1 Control Functions

| No. | Device | Name / Function  | Normal Status During Operation | Remarks  |
|-----|--------|--|--------------------------------|--|
| ①   | 52R    | <u>Main circuit AC input circuit breaker</u><br>When the AC input is normal, power is supplied to the UPS through this circuit breaker.  | ON                             | When the circuit breaker is tripped in manual mode, reset it by grasping the handle and pulling it down or to the right. |
| ②   | 72B    | <u>Main circuit DC input circuit breaker</u><br>When AC input has been cut off, power is supplied from the battery to the UPS through this circuit breaker.                          | ON                             |  |
| ③   | 52C    | <u>Bypass AC circuit breaker</u><br>When bypass power is supplied, power is supplied to the load through this circuit breaker.   | ON                             |  |
| ④   | 52M    | <u>Maintenance bypass AC circuit breaker</u><br>When bypass power is supplied for UPS maintenance, power is supplied to the load through this circuit breaker.                       | OFF                            |  |
| ⑤   | 52L    | <u>AC output circuit breaker</u><br>While UPS power or bypass power is supplied, power is supplied to the load through this circuit breaker.   | ON                             |  |
| ⑥   | 8A     | <u>Control power source switch</u><br>When AC input is normal, pressing this switch supplies power to the control power source.  | ON                             | Certain systems are also provided with the switch 8D.  |
| ⑦   | 6CH    | <u>Precharge circuit button</u><br>Pressing this button supplies power to the circuit that precharges the DC electrolytic capacitor before power is supplied to circuit breaker 52R. | ON                             |  |

## 6.2 Circuit Configuration

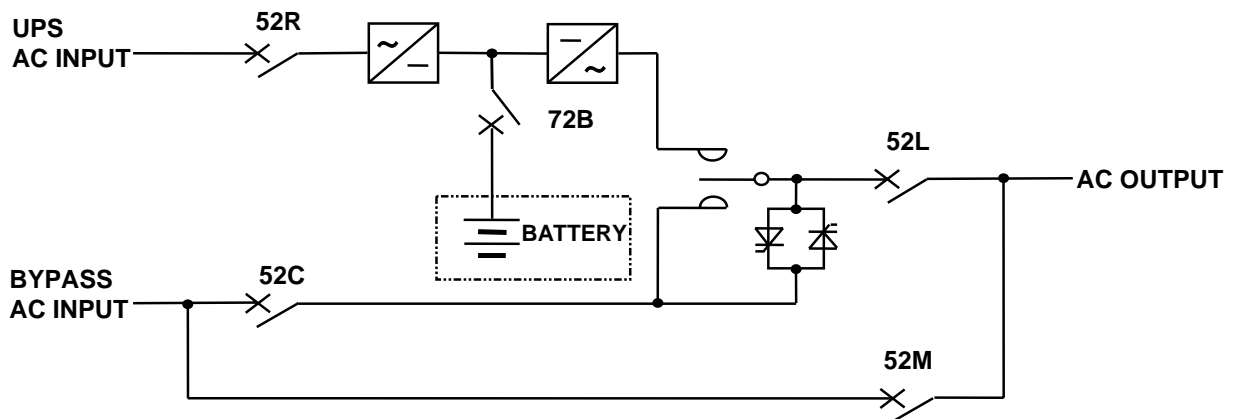
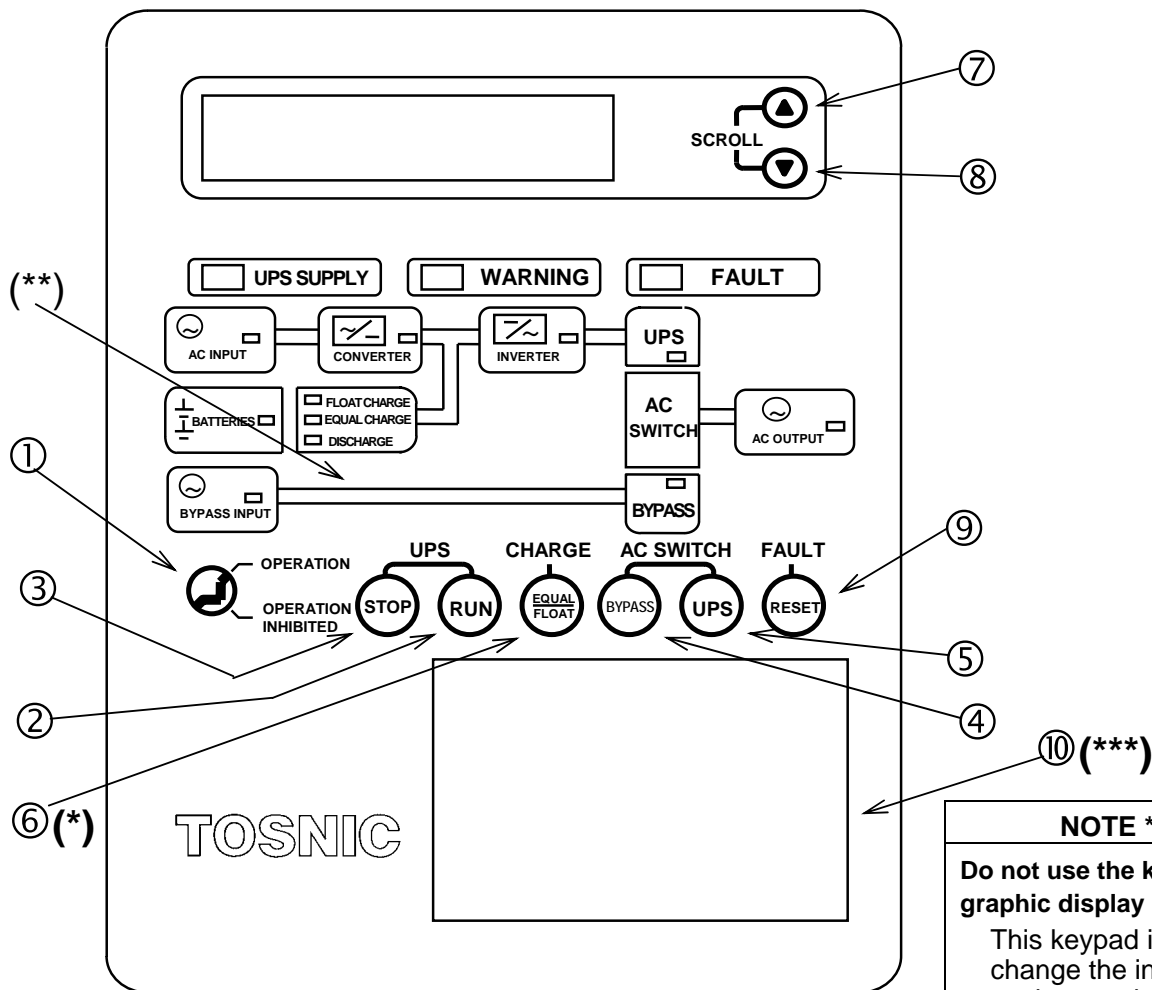


Figure 6.2 Standard Circuit Configuration

### 6.3 Panel Controls

|              |   |
|--------------|---|
| <b>NOTES</b> | <p><b>When the unit has stopped due to failure, be sure to remove the memory card before resetting the LCD Failure Error screen on the panel, so you can give it to the service person.</b></p> <p>Resetting (restarting) the UPS without removing the memory card will delete the data needed to determine the cause of the failure.</p> <p><b>Every effort has been made to ensure safety in unit handling. However, when removing the memory card, do not touch the other sections of the unit.</b></p> <p>Touching the other sections of the unit may result in electric shock.</p> |
|--------------|---|

The locations of the controls on the panel are shown in Figure 6.3.1. For the functions of each of the controls, see Section 6.3.1 "Panel Key-switch" and Section 6.3.2 "Panel Keys."



**Figure 6.3.1 Panel Controls**  
(For individual battery systems. For HS or AHH batteries.)

- \* This will be the "FLOAT" key for MSE individual battery systems.
- \*\* This will be the "PROTECTION" LED for MSE individual battery systems.

**NOTE \*\*\***

**Do not use the keypad on graphic display panel ⑩.**

This keypad is used to change the internal settings and should only be used by maintenance personnel. It is not used during normal operation.

### 6.3.1 Panel Key-switch

Table 6.2 shows the function of the key-switch on the graphic display panel.

**Table 6.2 Key-switch Function**

| No. | Name           | Function   | Remarks   |
|-----|----------------|--|---|
| ①   | OPERATION LOCK | Setting this key-switch to the "OPERATION" side enables operation using the buttons on the panel; setting it to the "OPERATION INHIBITED" side prevents operation. When the switch is set to the "OPERATION INHIBITED" side, buttons ② - ⑥ and ⑨ in Table 6.3 are inoperative and pressing them has no effect upon the operation of the UPS. LCD scroll buttons ⑦ and ⑧ are effective regardless of the position of this switch. | Normally setting the switch to the "OPERATION INHIBITED" prevents operational errors. The key can be removed when it is set to the "OPERATION INHIBITED" position; it cannot be removed when the switch is set to the "OPERATION" position. |

### 6.3.2 Panel Keys

Table 6.3 shows the functions of the keys on the graphic display panel.

|              |  |
|--------------|--|
| <b>NOTES</b> | <p><b>When operating the keys on the graphic display panel, hold down the key for at least 0.5 second.</b></p> <p><b>When operating the reset key on the graphic display panel, hold down the key for at least 5 seconds.</b></p> <p>The operation may not be performed if the key is held down for shorter periods of time.</p> |
|--------------|--|

**Table 6.3 Key Functions (For HS or AHH individual battery systems)**

| No. | Name   | Function                       | Remarks  |
|-----|--------|--------------------------------|--|
| ②   | RUN    | Starts up the UPS.             | The UPS starts up when this key is pressed after the required operational preparations are complete. |
| ③   | STOP   | Stops the UPS.                 | Pressing this key during operation prepares the UPS to be stopped with the required procedure.*      |
| ④   | UPS    | Changes to UPS power supply    | Pressing this key during UPS operation when bypass power is being supplied changes it to UPS power.  |
| ⑤   | BYPASS | Changes to bypass power supply | Pressing this key during UPS operation when the bypass is normal changes it to bypass power.         |



**Table 6.3 Key Functions (For HS or AHH individual battery systems) (continued)**

| No. | Name                   | Function   | Remarks   |
|-----|------------------------|--|---|
| ⑥   | FLOAT / EQUAL**<br>*** | Changes the battery charging mode.                                       | Pressing this key during UPS operation changes the status to equalized charge (If it is currently set to floating charge) or floating charge (If it is currently set equalized charge). |
| ⑦   | SCROLL UP              | These keys switch the screen displayed on the LCD.                       | For details, see Section 9.2.4 "Scrolling Through LCD Screens in the Event of Failure" on Page 47, and Section 7.2.4 "Changing the LCD Screen switching" on page 24.                    |
| ⑧   | SCROLL DOWN            |  |   |
| ⑨   | RESET                  | Resets the Failure Data screen and Warning Data screen shown on the LCD. |   |

\* Pressing this key when a power outage has occurred (during DC operation), causing a trip error and stopping the UPS. For special systems in which a separate DC UPS is connected to this unit for use as a control power source, the unit stops normally.

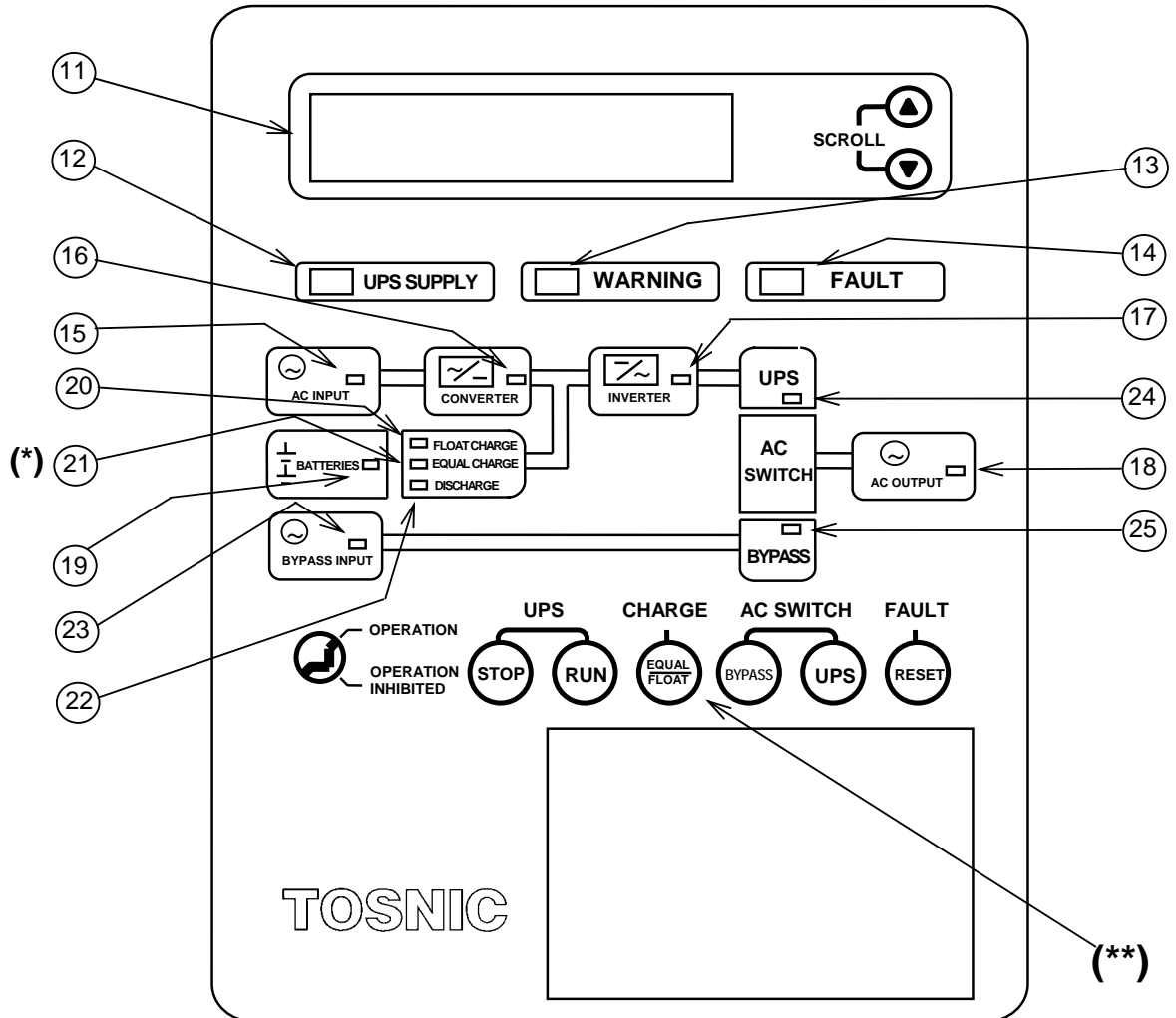
\*\* In an MSE individual battery system, the FLOAT switch switches the battery charge mode from protected to floating.

\*\*\* This switch is not present in shared battery systems.

## 7. Panels

### 7.1 Graphic Display Panel

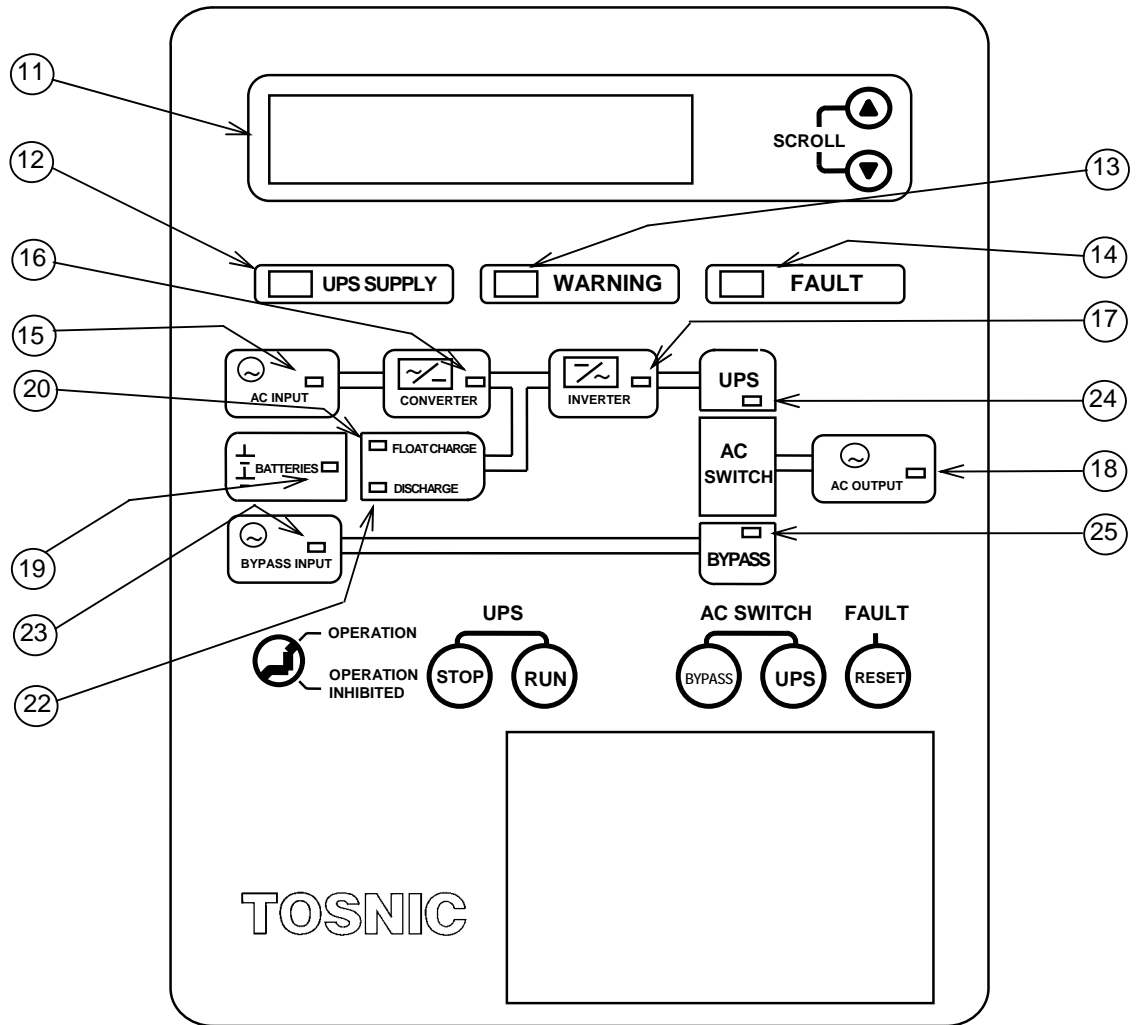
Figure 7.1.1 and 7.1.2 and Table 7.1 show the locations and functions of the controls on the graphic display panel.



\* This will be the "PROTECTION" LED for MSE individual battery systems.

\*\* This will be the "FLOAT" key for MSE individual battery systems.

**Figure 7.1.1 Graphic Display Panel Controls (For HS or AHH battery)**



**Figure 7.1.2 Graphic Display Panel Control**  
 (Graphic Display Panel of the type without the equalized charge mode and the protection charge mode).

**Table 7.1 Display Panel Functions (For HS or AHH individual battery systems)**

| No. | Name                  | Function   |
|-----|-----------------------|--|
| ⑪   | LCD INDICATOR         | Displays help messages, measurement data and warning descriptions. For more information, see Section 7.2 "LCD Display."                      |
| ⑫   | UPS SUPPLY LED        | This LED lights up when the UPS is operating.  |
| ⑬   | WARNING LED           | This LED blinks in the event of an warning.  |
| ⑭   | FAULT LED             | This LED lights up in the event of a UPS failure.  |
| ⑮   | AC INPUT LED          | This LED lights up when the AC input circuit breaker (52R) has gone ON.  |
| ⑯   | CONVERTER LED         | This LED is unlit when the converter has stopped operating. It blinks when the converter is starting up and is lit when startup is complete. |
| ⑰   | INVERTER LED          | This LED is unlit when the inverter has stopped operating. It blinks while the inverter is starting up and is lit when startup is complete.  |
| ⑱   | AC OUTPUT LED         | This LED lights up when the AC output circuit breaker (52L) is ON and AC voltage has been established.                                       |
| ⑲   | BATTERIES LED         | This LED lights up when the main circuit DC input circuit breaker (72B) has goes ON.   |
| ⑳   | FLOATING CHARGE LED** | This LED lights up when the charging mode is set to floating charge.   |
| ㉑   | EQUAL CHARGE LED* **  | This LED lights up when the charging mode is set to equalized charge.  |
| ㉒   | DISCHARGE LED         | This LED lights up when the battery is being discharged.   |
| ㉓   | BYPASS INPUT LED      | This LED lights up when the bypass input circuit breaker (52C) has gone ON.  |
| ㉔   | UPS LED               | This LED lights up when the selector switch is set to the UPS side.  |
| ㉕   | BYPASS LED            | This LED lights up when the selector switch is set to the bypass side.   |

\* This becomes the PROTECTION LED in MSE individual battery systems.

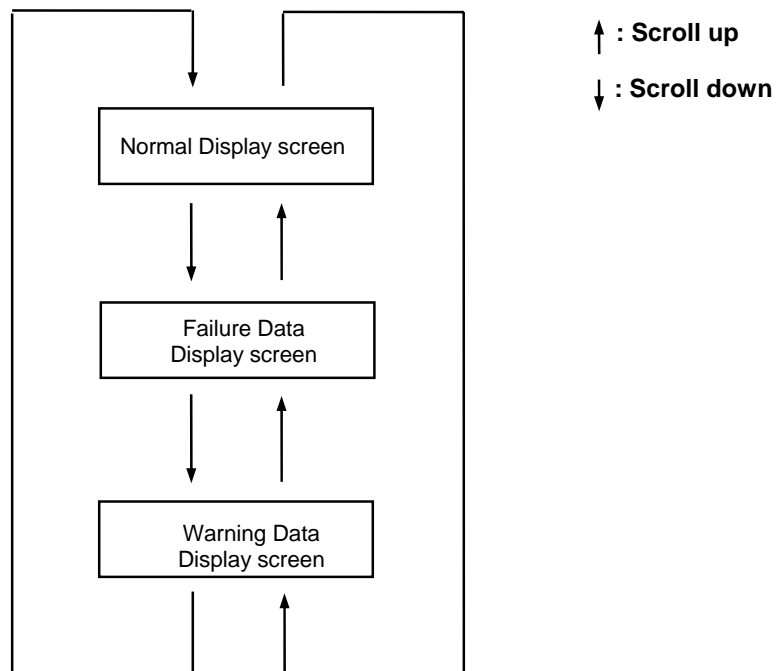
\*\* This switch is not present in shared battery systems.

## 7.2 LCD Display

The LCD Display screens consist of the following screens.

- (1) Normal Display screen ..... Initial display, operation guidance, and measurement value display
- (2) Failure Data Display screen ..... Displays detailed data when a failure occurs.
- (3) Warning Data Display screen... Displays detailed data when a warning occurs.

The operator can switch between these screens by pressing the scroll keys.



### 7.2.1 Normal Display Screen

The Normal Display screen indicates the operational status of the UPS and provides a total of nine screens: one Operation Guidance Display screen and eight Measurement Value Display screens.

Table 7.2 presents examples of these screens.

**Table 7.2 Normal Display Screen**

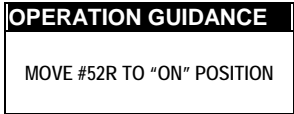
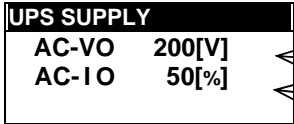
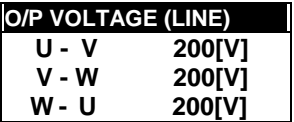
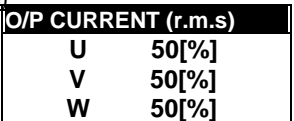
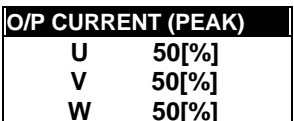
| No. | LCD Screen  | Description   |
|-----|---|---|
| 1   | <u>Help screen</u><br>(Example 1) Operation status<br>                         | Shows the status of the UPS at the top and help messages or measurements underneath.<br><br>(Example 1) Shows help messages when starting or stopping operation.  |
|     | (Example 2)<br>  | (Example 2) Shows the output voltage and output current during operation.   |
| 2   | <u>Measurement screen</u><br>(Example) <u>Output voltage</u><br>             | Shows the output voltage between lines.   |
| 3   | <u>Measurement screen</u><br>(Example) <u>Output current (RMS value)</u><br> | Shows the RMS value for the output current for each phase as a proportion (%) of the rated value.   |
| 4   | <u>Measurement screen</u><br>(Example) <u>Output current (peak)</u><br>      | Shows the peak value for the output current for each phase as a proportion (%) of the rated value.<br><br>$\frac{\text{Peak value for actual output current}}{\text{TMRS value for rated current} \times 1.41} \times 100 [\%]$ |

Table 7.2 Normal Display Screen (continued)

|   |   |  |
|---|---|--|
| 5 | <u>Measurement screen</u><br>(Example) <u>Output frequency</u><br><div> <b>O/P FREQUENCY</b><br/> <b>FREQ. 60.0[Hz]</b> </div>  | Shows the output frequency.  |
| 6 | <u>Measurement screen</u><br>(Example) <u>AC input</u><br><div> <b>AC INPUT</b><br/> <b>AC I/P-V 200[V]</b><br/> <b>FREQ. 60.0[Hz]</b> </div>                         | Shows the frequency and voltage values for AC input.   |
| 7 | <u>Measurement screen</u><br>(Example) <u>Bypass input</u><br><div> <b>BYPASS INPUT</b><br/> <b>BYP I/P-V 200[V]</b><br/> <b>FREQ. 60.0[Hz]</b> </div>                | Shows the frequency and voltage values for bypass input.   |
| 8 | <u>Measurement screen</u><br>(Example) <u>DC value</u><br><div> <b>DC INPUT</b><br/> <b>DC-V 401[V]</b><br/> <b>BATT-V 401[V]</b><br/> <b>BATT-I 0[A]</b> </div>      | Shows the DC voltage and DC current.<br>For the current value, "-" indicates charging and the absence of a plus/minus sign indicates discharging.            |
| 9 | <u>Measurement screen</u><br>(Example) <u>Counter value</u><br><div> <b>MODE COUNT</b><br/> <b>UPS 17544[H]</b><br/> <b>BATTERY 32[MIN]</b><br/> <b>0[TIM]</b> </div> | Shows the total time of UPS operation and the number of times the battery has been operated and total time for battery use (the time AC input has been off). |

### 7.2.2 Failure Display Screen

The Failure Display screen indicates the presence or absence of failure data and displays that data if present.

**Table 7.3 Failure Display Screen**

| LCD Screen                              | Description   |
|---|---|
| Presence or absence of failure data<br> | This screen indicates the presence or absence of failure data.<br>This screen is displayed if there is no failure data, or if all failure data has been reset with the "fault display reset" key.   |
| Failure data<br>                        | The failure data, the time the failure occurred, and an indication as to whether or not there is any other failure data is displayed with this screen if a failure occurs.<br>When there is other failure data, that other data can be displayed using the $\Delta$ $\nabla$ scroll keys. |

- \* If there is failure data, that data will remain in the system, even after the actual cause of the failure has been resolved, until the failure display reset key on the front of the panel is pressed and held down for at least 5 seconds. Note that the failure data is not deleted when the unit is turned off.

### 7.2.3 Warning Data Display Screen

The Warning Data Display screen indicates the presence or absence of warning data and displays that data if present.

**Table 7.4 Warning Data Display Screen**



| LCD Screen                              | Description   |
|---|---|
| Presence or absence of warning data<br> | This screen indicates the presence or absence of warning data.<br>This screen is displayed if there is no warning data, or if all warning data has been reset with the "fault display reset" key.   |
| Warning date<br>                        | The warning data, the time the warning occurred, and an indication as to whether or not there is any other warning data is displayed with this screen if a warning occurs.<br>When there is other warning data, that other data can be displayed using the $\Delta$ $\nabla$ scroll keys. |



## 7.2.4 LCD Screen Switching

The  $\Delta$  and  $\nabla$  scroll buttons on the front of the panel are used to switch the screen displayed on the LCD.

See figure 6.3.1 for the location of the  $\Delta$  and  $\nabla$  scroll buttons.

| Symbol  | Name        | Description                                   |
|---|-------------|---|
|  | SCROLL UP   | Moves to the previous screen (see Figure 7.2) |
|  | SCROLL DOWN | Moves to the next screen (see Figure 7.2)     |

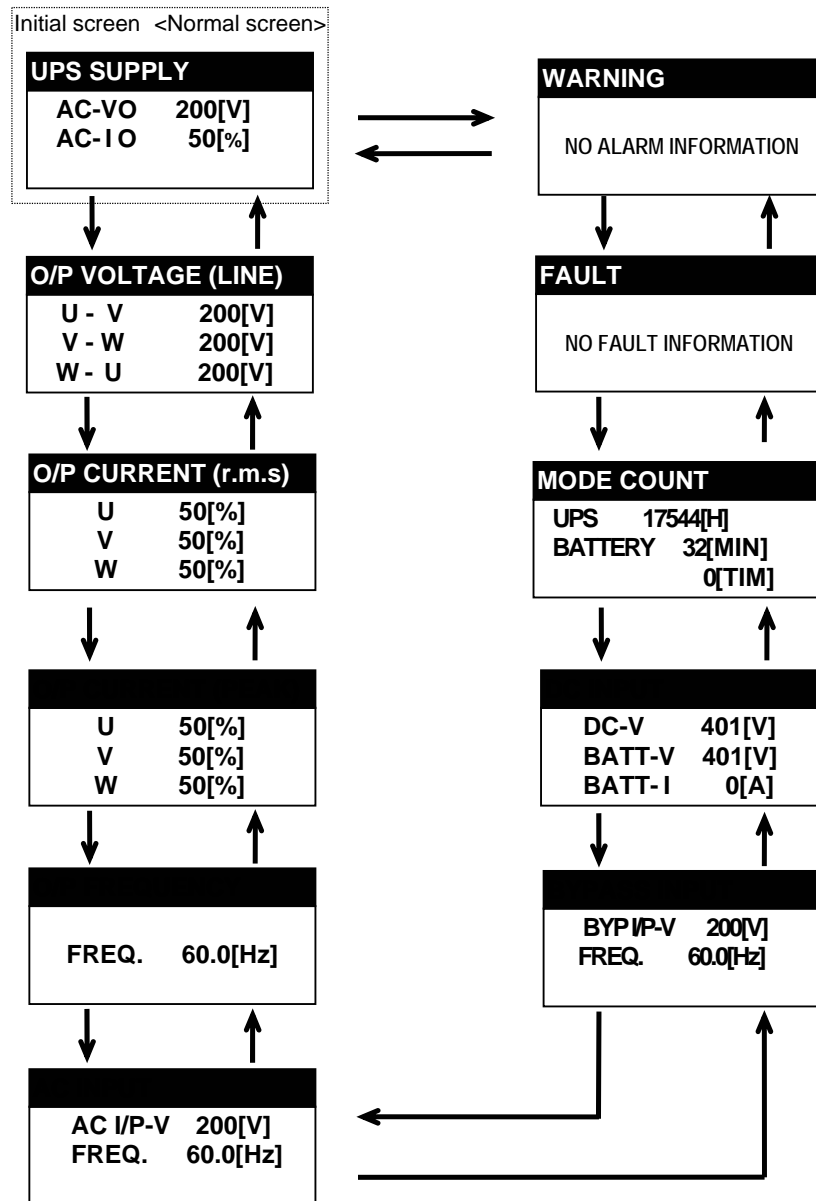



Figure 7.2 Using the Scroll Keys

## 8. Operation

|  |   |
|--|---|
|  <b>CAUTION</b> | <p><b>Operators should be qualified* personnel.</b><br/>Operation of the UPS by unqualified or untrained personnel may result in electric shock, injury or failure.</p> <p>* In accordance with customer stipulations</p> <p><b>Make sure you understand the meaning of the warning labels on the equipment, and follow the precautions indicated.</b><br/>Operating the equipment with an inadequate understanding of these matters may result in electric shock or burns.</p> <p>See Page 6 for the location of these warning labels.</p> |
|--|---|

This section will describe the basic procedures used to operate the UPS.

|              |   |
|--------------|---|
| <b>NOTES</b> | <p><b>Operate the unit within the ambient conditions noted in the specifications.</b><br/>Operating the unit outside these ranges may result in failure.</p> <p><b>During operation, do not turn off the air conditioner for the UPS chamber and the battery chamber.</b><br/>This will cause the temperature in these chambers to rise and may result in failure.</p> <p><b>When starting or stopping the equipment, monitor the operation on the graphic display panel LCD and follow the procedures.</b></p> <p><b>Do not leave the unit for long periods of time (1 week) with control power source switch (8A) in the OFF position.</b><br/>This can cause the backup capacitor on the control board to become discharged and result in incorrect time display and other problems.</p> |
|--------------|---|

## 8.1 Types of Operation

This section summarizes the types of operations covered in this manual and their objectives. Refer to the attached operating procedures document for specific details on the operating procedures.

| No. | Operation                          | General Description/Objective   | Page No. |
|-----|------------------------------------|---|----------|
| 1   | Startup                            | Starts up and operates the stopped UPS.   | Page 27  |
| 2   | Switch Power Supply                | Switches between UPS power supply and bypass power supply.  | Page.31  |
| 3   | Stop                               | Stops a UPS that is operating.  | Page 32  |
| 4   | Complete shutdown                  | Turns off the control power supply and shuts down the UPS completely.   | Page 34  |
| 5   | Charge (floating/equalized)        | Changes the mode for battery charging (in the case of HS or AHH individual battery).  | Page 36  |
| 6   | Floating charge                    | Used to change the charging mode manually from protective charge to floating charge (in the case of an MSE individual battery).               | Page 39  |
| 7   | Supply power to maintenance bypass | Changes the supply of power to the load to bypass power supply (when the UPS must be shut down completely for maintenance, inspection, etc.). | Page 39  |

## 8.2 Pre-operational check

Be sure to check the following items before operating the UPS:

- (1) Make sure all internal covers are in place.
- (2) Make sure all doors are closed. If doors are opened to operate circuit breakers, switches and the like, be sure to close them afterward.
- (3) Make sure the air conditioners in the UPS chamber and battery chamber are operating.
- (4) When starting up the UPS, make sure all circuit breakers (52R, 72B, 52C, 52L and 52M) and switches (8A and 6CH) are off. (Certain systems are also provided with the switch 8D.)
- (5) When starting up the UPS, check on the equipment supplying power to the UPS to make sure AC input voltage is being supplied to the UPS.

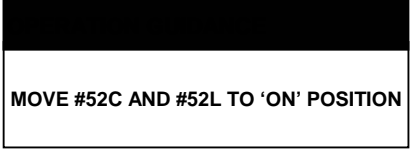
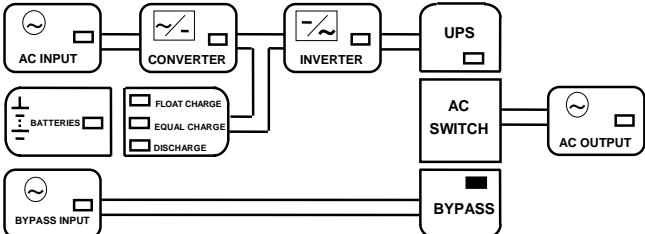

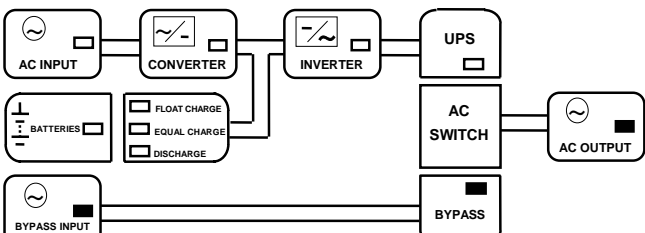

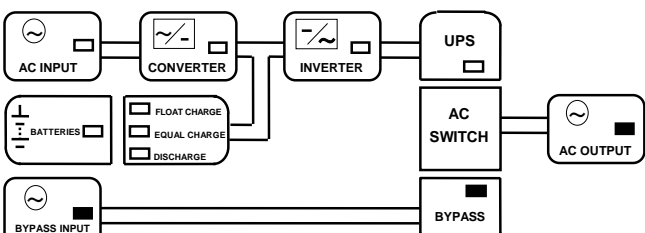
## 8.3 Procedures

### 8.3.1 Startup

Table 8.1 shows the procedure used to start up the UPS.

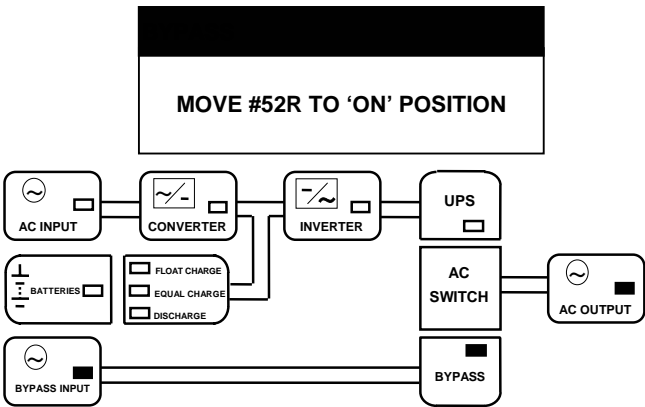
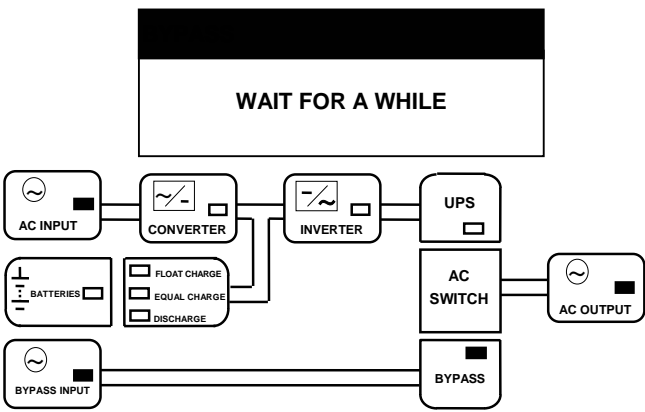
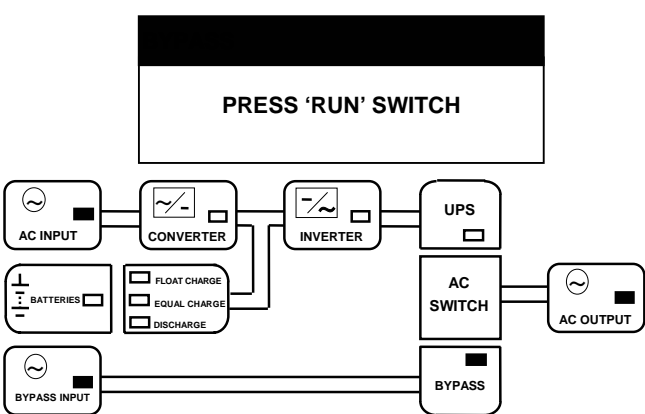
LED status    □: Unlit    ■: Lit    : Blinking

**Table 8.1    Startup Procedures**

| Step | Procedure   | LCD/LED Status (After Execution)   |
|------|---|--|
| 1    | Turn on the control power supply switch (8A) on the panel.  | <div style="text-align: center;">  </div>  <p style="text-align: center;">The "BYPASS" LED lit.</p>                            |
| 2    | Turn on the bypass AC input 52C and the AC output 52L circuit breakers.<br><br>(The UPS will change to bypass power supply status and AC output voltage will be generated.) | <div style="text-align: center;">  </div>  <p style="text-align: center;">The "BYPASS INPUT" and The "OUTPUT" LEDs lit.</p> |
| 3    | Turn on the precharge circuit switch (6CH)*.  | <div style="text-align: center;">  </div>    |

\* The control power supply switch 8A is left in the on state (Do not turn this switch off.)

Table 8.1 Startup Procedures (continued)

| Step | Procedure  | LCD/LED Status (After Execution)   |
|------|--|--|
| 4    | Wait several seconds.**  |                                  |
| 5    | When the message appears, turn on the main circuit AC input circuit breaker (52R). |  <p>The "AC INPUT" LED Lit.</p> |
| 6    | Wait several seconds.  |                                |

\*\* Do not turn on circuit breaker 52R until the following message appears on the display:  
"MOVE #52R TO 'ON' POSITION"

**Table 8.1 Startup Procedures (continued)**

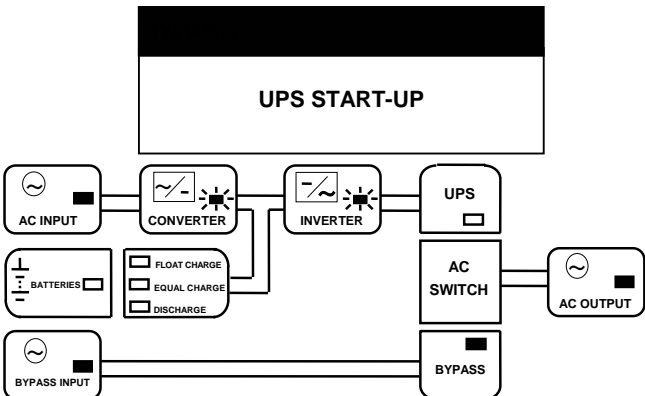
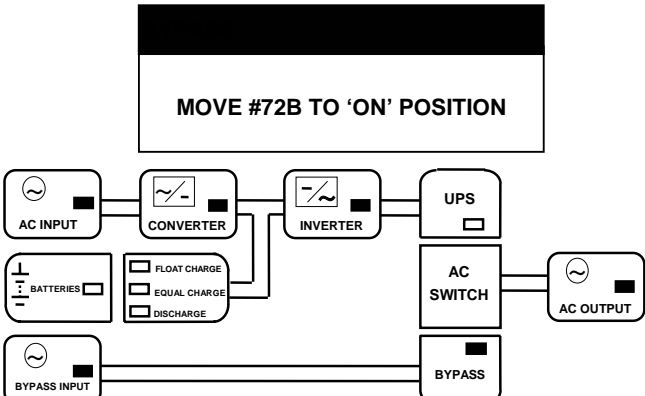
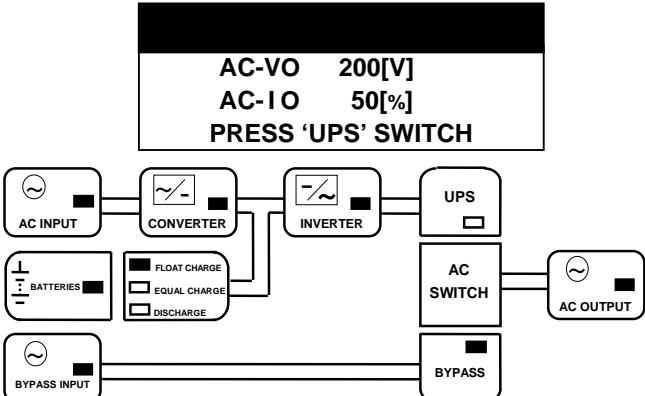
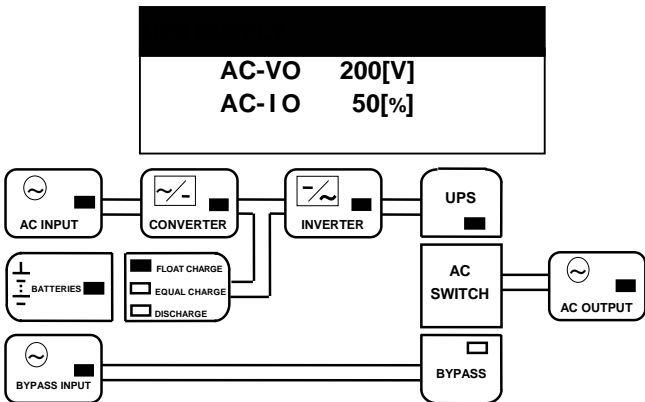
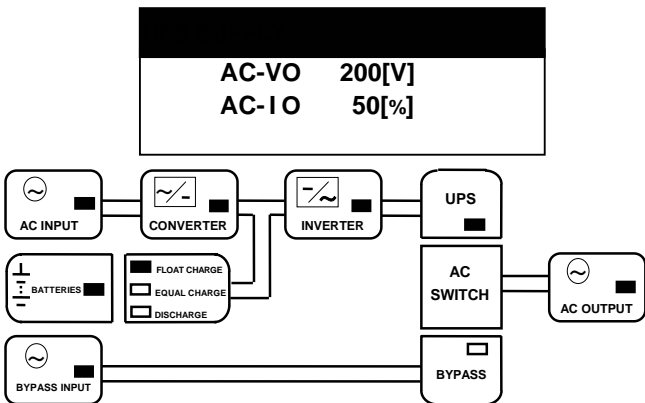
| Step | Procedure  | LCD/LED Status (After Execution)   |
|------|--|--|
| 7    | Hold down the "RUN" key (Ⓜ in Figure 6.3.1 on page 14) for at least 0.5 second.    |  <p>The "CONVERTER" and "INVERTER" LEDs blinking.</p>  |
| 8    | Wait several seconds for the startup process to finish.                            |  <p>The "CONVERTER" and "INVERTER" LEDs lit.</p>      |
| 9    | When the message appears, turn on the main circuit DC input circuit breaker (72B). |  <p>The "BATTERIES" and "FLOAT CHARGE" LEDs lit.</p> |

Table 8.1 Startup Procedures (continued)

| Step | Procedure  | LCD/LED Status (After Execution)  |
|------|--|---|
| 10   | <p>Hold down the “UPS” key (Ⓢ in the Figure 6.3.1 on page14) for at least 0.5 second. *</p> <p>→ The will start the power supply changing process.</p> |  <p>The "BYPASS" LED unlit and “UPS” LED lit.</p> |
| 11   | <p>Wait several seconds for the process to be completed (change to UPS power supply).</p> <p>→This completes the UPS staartup operation.</p>           |    |

\*If for some reason the AC switch dose not function, contact the Toshiba Service Center.  
Do not manually operate the solenoid contactor (which is part of AC switch).

### 8.3.2 Switch Power Supply (UPS → Bypass)

Table 8.2 shows the procedure used to switch between UPS power supply and bypass power supply.

**Table 8.2 UPS Power Supply → Bypass Power Supply**

| Step | Procedure  | LCD/LED Status (After Execution)  |
|------|--|---|
| 1    | Check to make sure power is being supplied to the UPS.   | <p>The diagram shows the power flow from AC INPUT through the CONVERTER and INVERTER to the UPS, then through the AC SWITCH to the AC OUTPUT. A BYPASS INPUT is also shown connected to the AC SWITCH. The LCD displays the following status:</p> <pre> AC-VO 200[V] AC-IO 50[%] </pre> |
| 2    | <p>Hold down the "BYPASS" key (④ in Figure 6.3.1 on page 14) for at least 0.5 second.</p> <p>→ The will start the power supply changing process.</p> | <p>The diagram shows the same power flow as in Step 1. The LCD displays the following status:</p> <pre> AC-VO 200[V] AC-IO 50[%] PRESS 'UPS' SWITCH </pre> <p>The "UPS" LED unlit and "BYPASS" LED lit.</p>   |
| 3    | <p>Wait several seconds for the process to be completed.</p> <p>→ Change to bypass power supply is completed.</p>                                    | <p>The diagram shows the same power flow as in Step 1. The LCD displays the following status:</p> <pre> AC-VO 200[V] AC-IO 50[%] PRESS 'UPS' SWITCH </pre>  |

\* To change from bypass to UPS power supply, use the procedure starting with Step 10 in Table 8.1 on page 30. If for some reason the AC switch dose not function, contact the

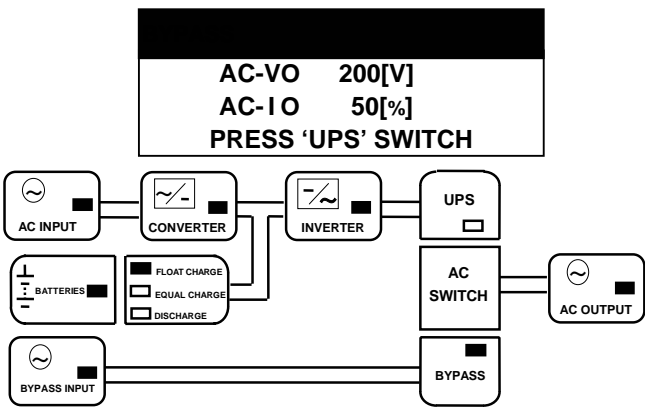
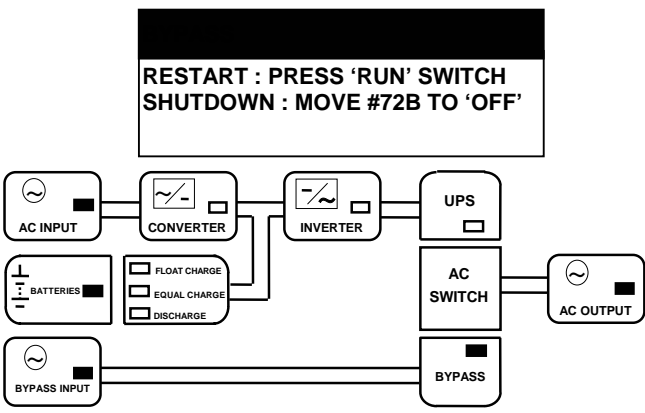


Toshiba Service Center. Do not manually operate the solenoid contactor (which is part of AC switch).

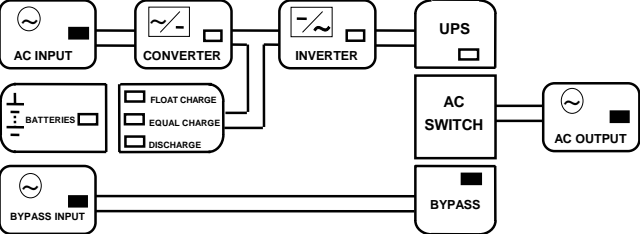
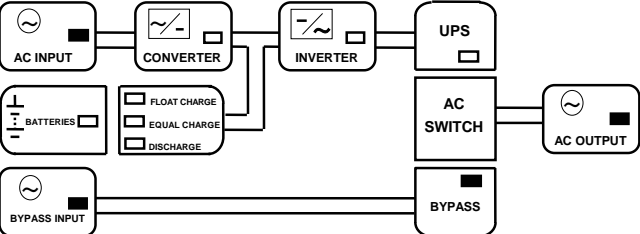
### 8.3.3 Stop

Table 8.3 shows the procedure used to stop the UPS.

**Table 8.3 Stop**

| Step | Procedure  | LCD/LED Status (After Execution)   |
|------|--|--|
| 1    | Change to bypass supply as described in Table 8.2 on page 31.                    |  <p>The "UPS" LED unlit and "BYPASS" LED lit.</p>                      |
| 2    | Hold down the "STOP" key (Ⓢ in Figure 6.3.1 on page 14) for at least 0.5 second. |  <p>The "FLOAT CHARGE" and "CONVERTER" and "INVERTER" LEDs unlit.</p> |

**Table 8.2 Stop (continued)**

| Step | Procedure  | LCD/LED Status (After Execution)  |
|------|--|---|
| 3    | Turn off the main DC input circuit breaker(72B). | <div data-bbox="889 310 1295 457"> <p><b>RESTART : PRESS 'RUN' SWITCH</b><br/> <b>SHUTDOWN : MOVE #52R TO 'OFF'</b></p> </div>  <p>The "BATTERIES" LED unlit.</p> |
| 4    | → This complete UPS shutdown                     | <div data-bbox="889 808 1295 955"> <p><b>RESTART : PRESS 'RUN' SWITCH</b><br/> <b>SHUTDOWN : MOVE #52R TO 'OFF'</b></p> </div>                                   |

### 8.3.4 Complete Shutdown

This section describes the procedure used to turn off the control power source and shut down the UPS completely (to turn everything up to the control power source off).

**Table 8.4 Complete Shutdown**

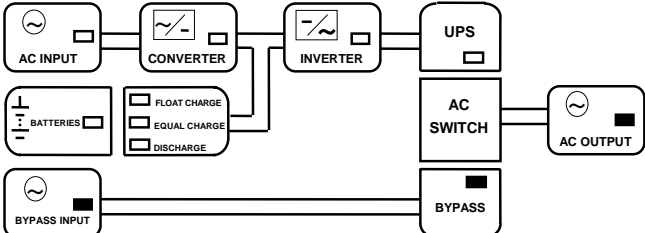
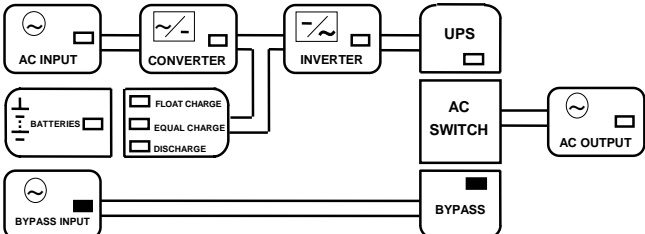
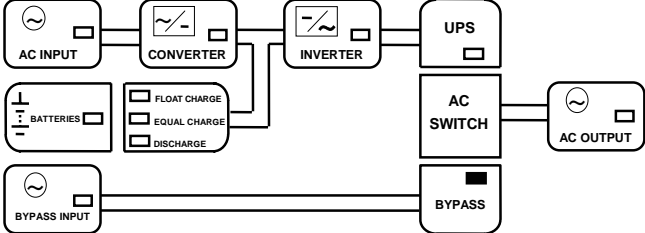
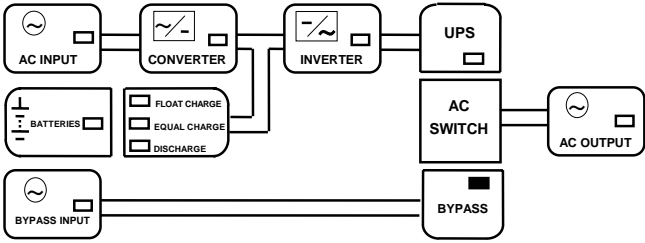
| Step | Procedure   | LCD/LED Status (After Execution)   |
|------|---|--|
| 1-4  | Same as steps 1-4 in Section 8.3.3 "Stop."  |  |
| 5    | When the message appears, turn off the main circuit AC input circuit breaker (52R). | <div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;"> <b>MOVE #52C AND #52L TO 'ON' POSITION</b> </div>  <p style="text-align: center;">The "AC INPUT" LED unlit.</p>  |
| 6    | Turn off the AC output circuit breaker (52L).                                       | <div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;"> <b>MOVE #52C TO 'OFF' POSITION</b> </div>  <p style="text-align: center;">The "AC INPUT" LED unlit.</p>  |
| 7    | Turn off the Bypass input circuit breaker (52C).                                    | <div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;"> <b>MOVE #6CH TO 'OFF' POSITION<br/>WAIT ABOUT 20 MINUTES<br/>MOVE #8A TO 'OFF' POSITION</b> </div>  <p style="text-align: center;">The "BYPASS INPUT" LED unlit.</p> |

Table 8.4 Complete Shutdown (continued)

| Step | Procedure  | LCD/LED Status (After Execution)  |
|------|--|---|
| 8    | Turn off the precharge circuit switch (6CH).   | <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <b>MOVE #6CH TO 'OFF' POSITION</b><br/> <b>WAIT ABOUT 20 MINUTES</b><br/> <b>MOVE #8A TO 'OFF' POSITION</b> </div>    |
| 9    | Wait about 20 minutes until the DC capacitor has been discharge.*  | <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <b>MOVE #6CH TO 'OFF' POSITION</b><br/> <b>WAIT ABOUT 20 MINUTES</b><br/> <b>MOVE #8A TO 'OFF' POSITION</b> </div>  |
| 10   | Using the scroll keys, change the display screen and check to make sure that the DC voltage is 0V (see Section 7.2.4 "LCD Screen Switching" on page 24). | <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <div style="background-color: black; height: 15px; width: 100%;"></div> <div style="display: flex; justify-content: space-between;"> <span>DC-V</span><span>0[V]</span> </div> <div style="display: flex; justify-content: space-between;"> <span>BATT-V</span><span>0[V]</span> </div> <div style="display: flex; justify-content: space-between;"> <span>BATT-I</span><span>0[A]</span> </div> </div> |
| 11   | Set the control power supply switch (8A) to the OFF position. *<br>→ Complete shutdown   | Nothing at all is displayed on the LCD and all LEDs are unlit.  |

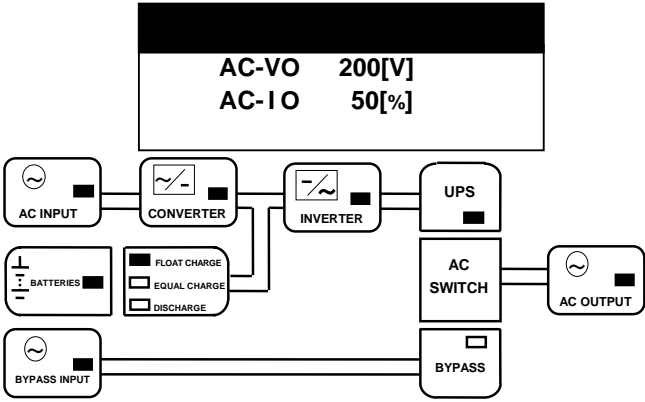
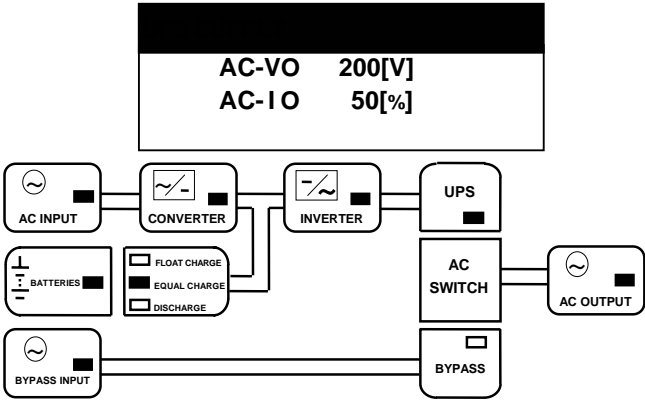
\* This operation is different from that displayed in the help message on the screen. Be sure to perform the operation as described here.

### 8.3.5 Changing Between Floating Charge and Equalized Charge (For HS or AHH individual battery systems)

This section describes the procedure used to change the charging mode. This operation does not apply to shared battery systems.

- (1) Table 8.5 shows the procedure used to change manually from floating charge to equalized charge.

**Table 8.5 Changing From Floating Charge to Equalized Charge**

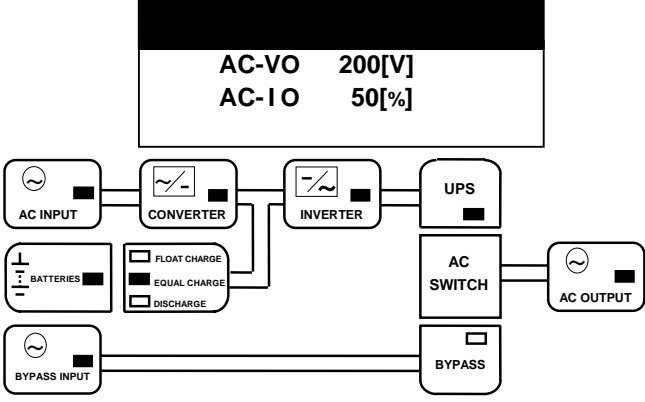
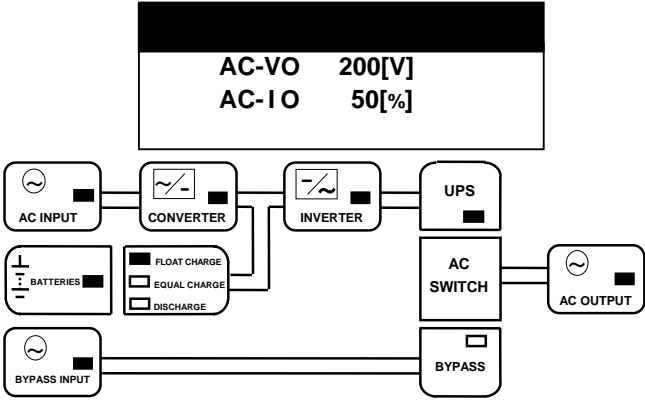
| Step | Procedure   | LCD/LED Status (After Execution)  |
|------|---|---|
| 1    | Check to make sure that the "FLOAT CHARGE" LED is lit.  |   |
| 2    | <p>Hold down the "FLOAT / EQUAL" key (Ⓢ in Figure 6.3.1 on page 14) for at least 0.5 second.</p> <p>→ Change to equalized charge is complete.</p> |  <p>The "EQUAL CHARGE" LED lit.<br/>The "FLOAT CHARGE" LED unlit.</p> |

- \* In equalized charge mode, the battery is charged for a set period of time at a voltage about 5% (depending on the type of battery) higher than normal (floating) charge, in order to prevent variations in battery performance. This must be done about once every six months, in spring and autumn if possible.
- The TOSNIC-7000S UPS is equipped with a function that performs the equalized charging process automatically when restoring the battery charge after a power outage or the like.

- (2) Table 8.5 shows the procedure used to change manually from equalized charge to floating charge.

After the charging mode has been changed to equalized charge using the procedure on the previous page, the mode will automatically change back to floating charge after a set period of time has elapsed. Therefore, normally there is no need to change the mode manually as described below.

**Table 8.6 Changing From Equalized Charge to Floating Charge**

| Step | Procedure  | LCD/LED Status (After Execution)   |
|------|--|--|
| 1    | Check to make sure that the "EQUAL CHARGE" LED is lit.   |    |
| 2    | <p>Hold down the "FLOAT / EQUAL" key (Ⓢ in Figure 6.3.1 on page 14) for at least 0.5 second.</p> <p>→ Change to floating charge is complete.</p> |  <p>The "FLOAT CHARGE" LED lit.<br/>The "EQUAL CHARGE" LED unlit.</p> |

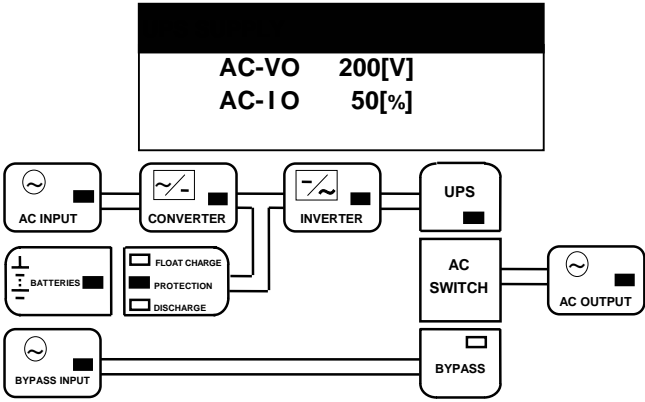
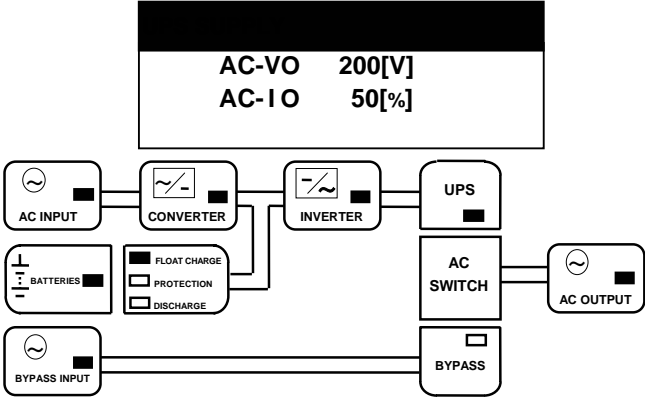
### 8.3.6 Changing to Floating Charge etc. (for MSE individual battery)

Table 8.7 shows the procedure used to change manually from protective charge to floating charge.

This operation does not apply to shared battery systems.

- (1) An MSE battery normally operate in floating charge mode.
- (2) To prevent the battery temperature from rising, the mode changes automatically to protective charge mode when a "BATT FAULT1" (BATTERY OVER TEMP.) warning occurs.
- (3) In protective charge mode, the battery is automatically charged at a voltage about 5% lower than normal (floating) charge when the battery temperature has risen above the rated value, in order to prevent deterioration caused by excessive charging at high temperatures.
- (4) After a set amount of time has elapsed (about 6 hours), if the "BATT FAULT1" (BATTERY OVER TEMP.) warning message has disappeared, the mode will automatically change back to floating charge. As a result, it will not normally be necessary to change the mode manually as described below.

**Table 8.7 Changing from Protective Charge to Floating Charge**

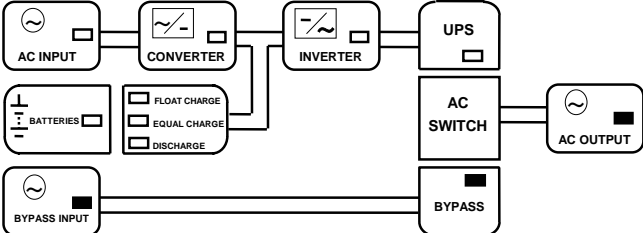
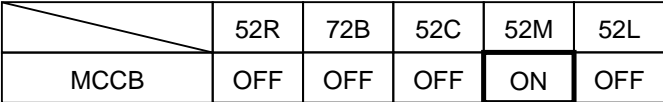
| Step | Procedure   | LCD/LED Status (After Execution)   |
|------|---|--|
| 1    | Check to make sure that the "PROTECTION" LED is lit..   |   |
| 2    | Check to make sure that the "BATT FAULT1" warning message has disappeared.  |  |
| 3    | Hold down the "FLOAT" key (Ⓢ in Figure 6.3.1 on page 14) for at least 0.5 second.<br>→ Change to floating charge is complete. | <br>The "FLOAT CHARGE" LED lit.<br>The "PROTECTION" LED unlit. |



### 8.3.7 Changing the Power Supply to Maintenance Bypass

This UPS must be completely shut down when performing maintenance and inspections. In such cases, the power supply to the load will go through the maintenance bypass. Table 8.8 shows the procedure used to change the power supply to this maintenance bypass. Table 8.9 shows how to change the power supply from the maintenance bypass back to the UPS.

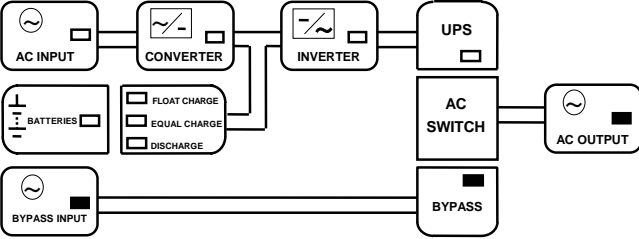
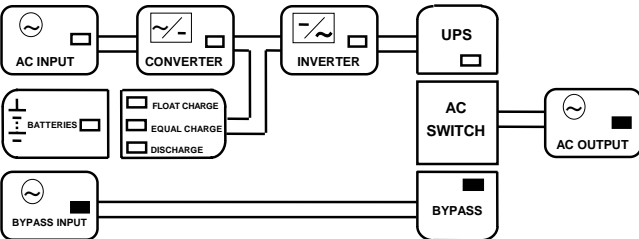
**Table 8.8 Changing From UPS to maintenance Bypass Power Supply**

| Step | Procedure   | LCD/LED Status (After Execution)  |     |     |     |     |     |     |      |     |     |     |    |     |
|------|---|---|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|----|-----|
| 1-3  | Same as steps 1-5 in Section 8.3.4 "Stop."  |   |     |     |     |     |     |     |      |     |     |     |    |     |
| 4    | Turn ON maintenance bypass AC circuit breaker 52M. ***  | <div><div>MOVE #52C AND #52L TO 'ON'</div><div><p>The diagram shows the internal components of a UPS system. It includes an AC INPUT, a CONVERTER, an INVERTER, a UPS unit, an AC SWITCH, a BYPASS INPUT, a BYPASS unit, and an AC OUTPUT. The AC INPUT is connected to the CONVERTER, which is connected to the INVERTER. The INVERTER is connected to the UPS unit. The UPS unit is connected to the AC SWITCH. The AC SWITCH is connected to the AC OUTPUT. The BYPASS INPUT is connected to the BYPASS unit, which is connected to the AC SWITCH. The AC SWITCH is also connected to the BYPASS unit. The AC INPUT is connected to the BYPASS INPUT. The AC OUTPUT is connected to the BYPASS INPUT. The AC SWITCH is connected to the BYPASS unit. The AC SWITCH is connected to the BYPASS unit. The AC SWITCH is connected to the BYPASS unit.</p></div><table><tr><td></td><td>52R</td><td>72B</td><td>52C</td><td>52M</td><td>52L</td></tr><tr><td>MCCB</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>ON</td></tr></table></div>   |     | 52R | 72B | 52C | 52M | 52L | MCCB | OFF | OFF | ON  | ON | ON  |
|      | 52R   | 72B   | 52C | 52M | 52L |     |     |     |      |     |     |     |    |     |
| MCCB | OFF   | OFF   | ON  | ON  | ON  |     |     |     |      |     |     |     |    |     |
| 5    | Perform steps 6 through 11 in Table 8.4 "Complete Shutdown" on page 34 to shut down the UPS completely.<br><br>→Change to maintenance bypass power supply complete. | <div><div>When the UPS is shutdown completely, nothing at all will be displayed on the LCD screen and all LEDs will be unlit.</div><div><p>The diagram shows the internal components of a UPS system. It includes an AC INPUT, a CONVERTER, an INVERTER, a UPS unit, an AC SWITCH, a BYPASS INPUT, a BYPASS unit, and an AC OUTPUT. The AC INPUT is connected to the CONVERTER, which is connected to the INVERTER. The INVERTER is connected to the UPS unit. The UPS unit is connected to the AC SWITCH. The AC SWITCH is connected to the AC OUTPUT. The BYPASS INPUT is connected to the BYPASS unit, which is connected to the AC SWITCH. The AC SWITCH is connected to the BYPASS unit. The AC INPUT is connected to the BYPASS INPUT. The AC OUTPUT is connected to the BYPASS INPUT. The AC SWITCH is connected to the BYPASS unit. The AC SWITCH is connected to the BYPASS unit. The AC SWITCH is connected to the BYPASS unit.</p></div><table><tr><td></td><td>52R</td><td>72B</td><td>52C</td><td>52M</td><td>52L</td></tr><tr><td>MCCB</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td></tr></table></div> |     | 52R | 72B | 52C | 52M | 52L | MCCB | OFF | OFF | OFF | ON | OFF |
|      | 52R   | 72B   | 52C | 52M | 52L |     |     |     |      |     |     |     |    |     |
| MCCB | OFF   | OFF   | OFF | ON  | OFF |     |     |     |      |     |     |     |    |     |

\* During load operation, always operate the circuit breakers in the following order :  
52M ON→52IL OFF→ 52C OFF

\*\* When power is supplied to the UPS, circuit breaker 52M cannot be turned on.

Table 8.9 Changing From Maintenance Bypass to UPS Power Supply

| Step | Procedure  | LCD/LED Status (After Execution)  |     |     |     |     |     |     |      |     |     |    |     |    |
|------|--|---|-----|-----|-----|-----|-----|-----|------|-----|-----|----|-----|----|
| 1    | Same as steps 1-4 in Section 8.3.1 “Startup”   | <div><div>MOVE #52R TO ‘ON’ POSITION</div><div></div><table><tr><td></td><td>52R</td><td>72B</td><td>52C</td><td>52M</td><td>52L</td></tr><tr><td>MCCB</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td></tr></table></div>  |     | 52R | 72B | 52C | 52M | 52L | MCCB | OFF | OFF | ON | OFF | ON |
|      | 52R  | 72B   | 52C | 52M | 52L |     |     |     |      |     |     |    |     |    |
| MCCB | OFF  | OFF   | ON  | OFF | ON  |     |     |     |      |     |     |    |     |    |
| 2    | Turn OFF maintenance bypass AC circuit breaker 52M. *****                              | <div><div>MOVE #52R TO ‘ON’ POSITION</div><div></div><table><tr><td></td><td>52R</td><td>72B</td><td>52C</td><td>52M</td><td>52L</td></tr><tr><td>MCCB</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>ON</td></tr></table></div> |     | 52R | 72B | 52C | 52M | 52L | MCCB | OFF | OFF | ON | ON  | ON |
|      | 52R  | 72B   | 52C | 52M | 52L |     |     |     |      |     |     |    |     |    |
| MCCB | OFF  | OFF   | ON  | ON  | ON  |     |     |     |      |     |     |    |     |    |
| 3    | Same as steps 5-11 in Section 8.3.1 “Startup”<br>→Change to UPS power supply complete. |   |     |     |     |     |     |     |      |     |     |    |     |    |

\* During load operation, ALWAYS operate the circuit breakers in the following order:  
52C ON → 52L ON → 52M OFF

\*\* UPS power supply is disabled when the 52M circuit breaker is in the on state.

\*\*\* This operation is different from that displayed in the help message on the screen.  
Be sure to perform the operation as described here.

## 9. Troubleshooting

When an error occurs on the UPS, error data is displayed on the LCD screen and the waveform is saved. This section will describe the types of errors, the error messages displayed on the LCD screen, the process of saving waveforms and the procedures used to correct the errors.

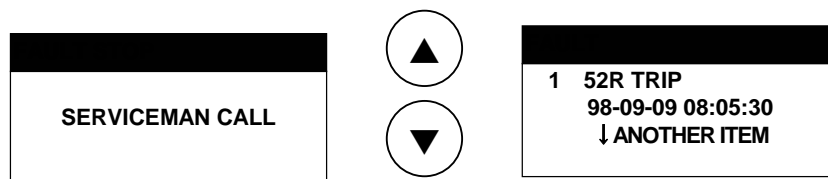
### 9.1 Types of Errors

The following types of errors may occur on the UPS:

| No. | Name   | Description  |
|-----|--|--|
| 1   | Fault (Trip)   | The UPS has been tripped and has stopped operating.  |
| 2   | Warning-1<br>(Converter stop/<br>Input power<br>error) | The converter has been stopped and power is being supplied from the battery. When the warning has been corrected, power is automatically supplied from AC input.                   |
| 3   | Warning-2<br>(Stop and<br>restart)                     | The unit changes to bypass power supply and the UPS stops operating. When the warning has been corrected, the unit will automatically be restarted and revert to UPS power supply. |
| 4   | Warning-3<br>(Operation<br>control)                    | An error or phenomenon related to an error occurred. Since this problem does not directly affect operation, the system switches to synchronized mode.                              |
| 5   | Warning-4<br>(guidance)                                | An error or indication of an error has occurred, but operation was not affected.   |

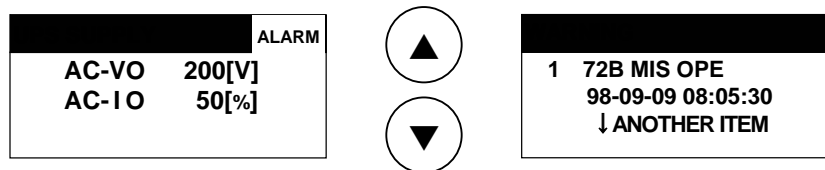
## 9.2 LCD Failure Displays

When a failure occurs, a screen such as that shown in Figure 9.1, and when a warning occurs, a screen such as that shown in Figure 9.2, will be displayed on the LCD.



Select the desired failure data with the scroll buttons.  
Detailed failure data can be displayed.

**Figure 9.1 Failure Display**



When a warning (a limitation on operation or a guidance failure) occurs, "ALARM" will be displayed in the upper right of the LCD.

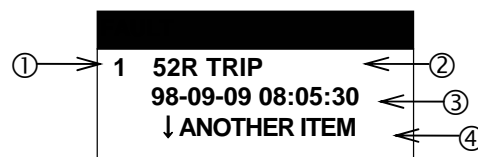
Select the desired warning data with the scroll buttons.  
Detailed warning data can be displayed.

**Figure 9.2 Warning Display**

### 9.2.1 Failure Data Screen

This screen appears when a trip error is detected.  
Up to 10 screens of failure data can be displayed.

Figure 9.3 and Table 9.1 show a sample screen and describe the data shown in the screen.



**Figure 9.3 Sample Failure Data Screen**

**Table 9.1 Failure Data Screen Descriptions**

| No. | Name             | Description   |
|-----|------------------|---|
| ①   | No.              | The number of the message in the order that it was detected (1 - 10).<br>(Up to 10 screens of failure data can be displayed.)   |
| ②   | Failure Message  | Shows the nature of the failure. For details, see Section 9.2.3 "Failure Messages".   |
| ③   | Time             | The date and time (in 24-hour time) that the failure was detected.  |
| ④   | Scroll indicator | Indicates whether there is a failure screen before or after this screen. <ul style="list-style-type: none"> <li>↑ indicates there is a failure screen before this screen.</li> <li>↓ indicates there is a failure screen after this screen.</li> <li>↑↓ indicates there are failure screens both before and after this screen.</li> </ul> |

## 9.2.2 Warning Data Screen

These screens appear when a warning has occurred. Up to 10 screens can be displayed. Figure 9.4 and Table 9.2 show an example of this type of screen and describe the data shown in the screen.



Figure 9.4 Sample Warning Data Screen

Table 9.2 Warning Data Screen Descriptions

| No. | Name             | Description   |
|-----|------------------|---|
| ①   | No.              | The number of the message in the order that it was detected (1 - 10). (Up to 10 screens of warning data can be displayed.)  |
| ②   | Warning Message  | Shows the nature of the warning. For details, see Section 9.2.3 "Failure Messages".   |
| ③   | Time             | The date and time (in 24-hour time) that the warning was detected.  |
| ④   | Scroll indicator | Indicates whether there is a warning screen before or after this screen. <ul style="list-style-type: none"> <li>• ↑ indicates there is a warning screen before this screen.</li> <li>• ↓ indicates there is a warning screen after this screen.</li> <li>• ↑↓ indicates there are warning screens both before and after this screen.</li> </ul> |

### 9.2.3 Failure Messages

Figures 9.6 show the locations for failure detection. Tables 9.4 through 9.8 list the failure messages described in Section 9.2.1 "Failure Data Screen". The content and display text for the failure and warning messages in Tables 9.4 through 9.8 have been created based on the standard protective configuration shown in Figures 9.6. UPS units can be shipped with different protective configurations from the standard if this is specified by the customer. See the protective configuration indicated on the elementary wiring diagram created for each UPS unit shipped.

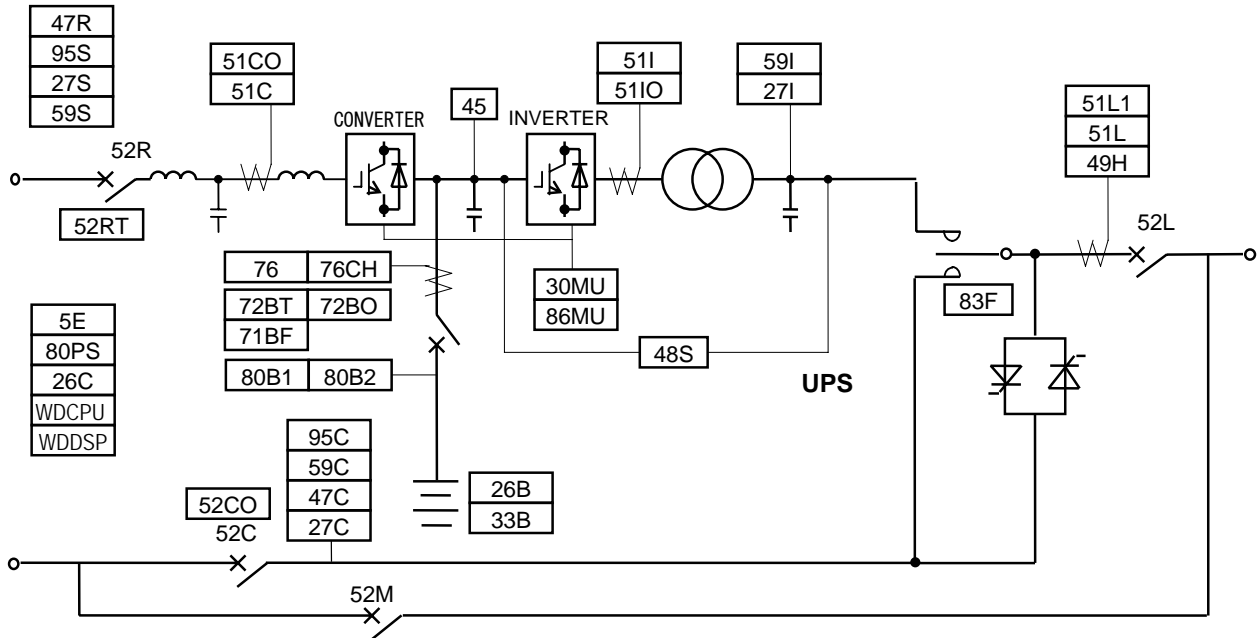


Figure 9.6 Protective Detector Locations

Table 9.4 Fault (Trip)

| # | Item  | LCD Message Indication | Description   |
|---|-------|------------------------|---|
| 1 | 52RT  | 52R TRIP               | AC input circuit breaker #52R tripped.                                  |
| 2 | 72BT  | 72B TRIP               | DC input circuit breaker #72B tripped.                                  |
| 3 | 71BF  | DC FUSE BLW            | DC Main circuit fuse blew.  |
| 4 | 86MU  | MU FAULT1              | An inverter or converted fuse blew.                                     |
| 5 | WDCPU | WDCPU                  | An error occurred in the main control microprocessor (CPU).             |
| 6 | 80PS  | CONT. PS. ERR          | The control power supply voltage fell.                                  |
| 7 | 80B1  | BATT UV                | Battery voltage is below discharged voltage.                            |
| 8 | 5E    | EPO SW ON              | An emergency stop was specified by the external contact input. (Option) |

Table 9.5 Warning - 1 (Converter stop/Input power error)

| # | Item | LCD Message Indication | Description               |
|---|------|------------------------|---------------------------|
| 1 | 27S  | AC I/P UV              | AC input voltage is low.  |
| 2 | 59S  | AC I/P OV              | AC input voltage is high. |
| 3 | 95S  | I/P FREQ. ERR          | AC input frequency error. |

Table 9.6 Warning - 2 (Stop and restart)

| #  | Item  | LCD Message Indication | Description   |
|----|-------|------------------------|---|
| 1  | 27I   | AC O/P UV              | AC output voltage is low.   |
| 2  | 59I   | AC O/P OV              | AC output voltage is high.  |
| 3  | 51L   | AC O/P OL              | Load is too high.   |
| 4  | 51I   | AC O/P OC              | Load overcurrent.   |
| 5  | 51IO  | INV OC                 | Inverter overcurrent.   |
| 6  | 76    | DC OC                  | Excessive current in DC section of main circuit.  |
| 7  | 45    | DC OV                  | Excessive voltage in DC section of main circuit.  |
| 8  | 51C   | AC I/P OC              | AC input overcurrent.   |
| 9  | 51CO  | CONV OC                | Converter overcurrent.  |
| 10 | 30MU  | MU FAULT2              | The converter and/or inverter gate voltage fell, or the converter and/or inverter overheated. |
| 11 | 26C   | OVER TEMP              | Temperature high in cubicle.  |
| 12 | WDDSP | CONTROL ERR            | An error occurred in the control microprocessor (DSP).  |

Table 9.7 Warning-3 (Operation control)

| # | Item | LCD Message Indication | Description                   |
|---|------|------------------------|-------------------------------|
| 1 | 59C  | BYPASS OV              | Bypass input voltage is high. |
| 2 | 27C  | BYPASS UV              | Bypass input voltage is low.  |
| 3 | 95C  | BYPASS ASY             | Bypass input frequency error. |

Table 9.8 Warning - 4 and 5 (Guidance)

| #  | Item | LCD Message Indication | Description   |
|----|------|------------------------|---|
| 1  | 49H  | LOAD LIMIT             | Load has exceeded prescribed level.                               |
| 2  | 51LI | O/P OC (PEAK)          | Load current peak value is high.                                  |
| 3  | 72BO | 72B MIS OPE.           | 72B has gone off during operation.<br>(Including operation error) |
| 4  | 26B  | BATT FAULT1            | Battery temperature has risen.                                    |
| 5  | 33B  | BATT FAULT2 *          | Battery fluid level has gone below prescribed level.              |
| 6  | 80B2 | BATT UV (ALM)          | Battery voltage is near discharged voltage.                       |
| 7  | 76CH | BATT OC                | Charging current is high.   |
| 8  | 47R  | AC PHASE ERR           | Phase ration of AC input is reserved.                             |
| 9  | 47C  | BYPASS ERR             | Phase ration of bypass input is reserved.                         |
| 10 | 48S  | STARTUP ERR            | Startup was not completed.  |
| 11 | 52CO | 52C MIS OPE.           | 52C has gone off during opearion.<br>(Including operation error)  |
| 12 | 83F  | SWITCH ERR             | Changeover switch error.  |

\* This message is deleted in case of a sealed type NS and HHS or MSE battery.



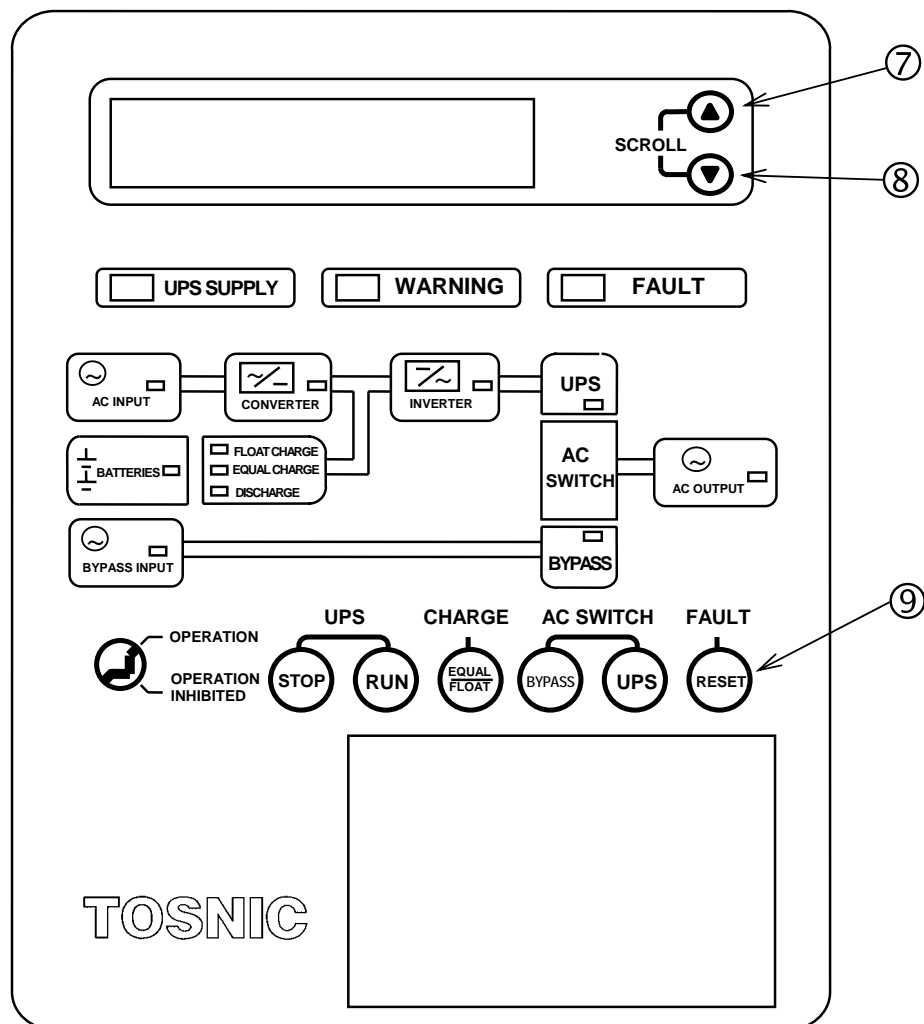
### 9.2.4 Scrolling Through LCD Screens in the Event of Failure

|              |   |
|--------------|---|
| <b>NOTES</b> | <p><b>When the unit has stopped due to failure, be sure to remove the memory card before resetting the LCD Failure Error screen on the panel, so you can give it to the service person.</b></p> <p>Resetting (restarting) the UPS without removing the memory card will delete the data needed to determine the cause of the failure.</p> <p><b>Every effort has been made to ensure safety in unit handling. However, when removing the memory card, do not touch the other sections of the unit.</b></p> <p>Touching the other sections of the unit may result in electric shock.</p> |
|--------------|---|

This section describes how to scroll through the LCD screens when a failure has occurred (in other words, when Failure Data screens exist).

Figure 9.8 shows the locations of the scroll keys used to scroll through the LCD screens. See Table 9.9 and Figure 9.9 for a discussion of the scroll keys and how they are used for screen scrolling.

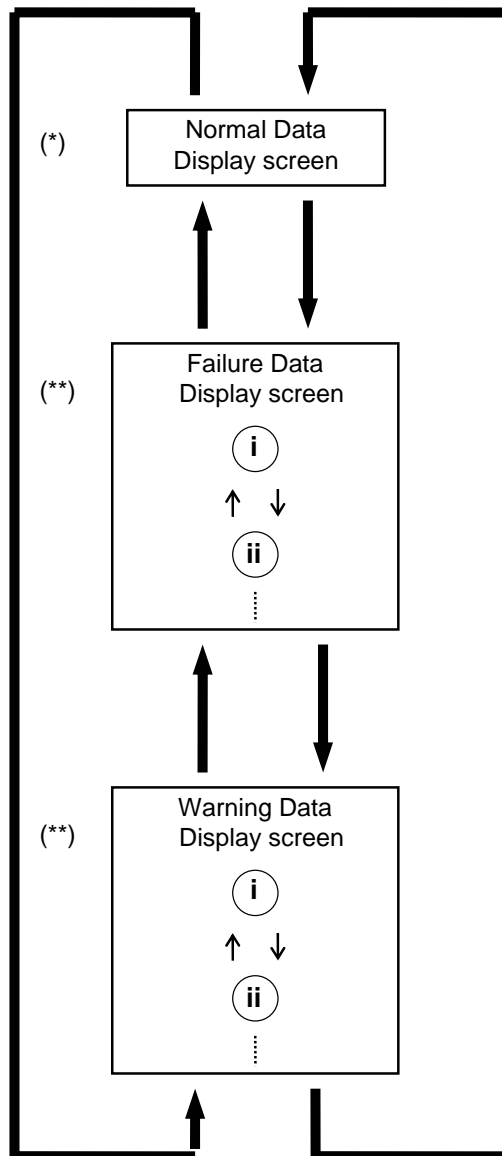
Note that pressing the "RESET" key ⑨ will delete the waveform data stored on the memory card as well as the Failure and Warning Data Screens. Be sure to remove the memory card before pressing the "RESET" key.



**Figure 9.8 Position of Scroll Keys in Failure Data Screens**  
(For Individual battery systems. For HS or AHH batteries.)

Table 9.9 Scroll Keys

| No. | Name        | Description  |
|-----|-------------|--|
| ⑦   | SCROLL UP   | Scrolls to the previous screen (see Figure 9.9)                                |
| ⑧   | SCROLL DOWN | Scrolls to the next screen (see Figure 9.9)                                    |
| ⑨   | RESET       | Deletes the stored waveform and failure and warning data from the memory card. |

**Remarks**

\* See section 7.2.1 (on page 21, "Normal Display Screen", for details on the content of the Normal Display screen.)

\*\* (i) (ii), etc. represent the order in which the failures occurred.

Figure 9.9 Changing Screens with Scroll Keys

### 9.3 Saving Waveforms

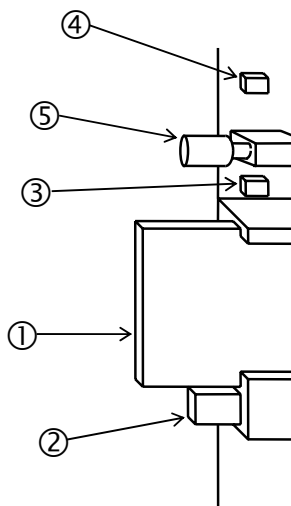
|       |   |
|-------|---|
| NOTES | <p><b>When the unit has stopped due to failure, be sure to remove the memory card before resetting the LCD Failure Error screen on the panel, so you can give it to the service person.</b></p> <p>Resetting (restarting) the UPS without removing the memory card will delete the data needed to determine the cause of the failure.</p> <p><b>Every effort has been made to ensure safety in unit handling. However, when removing the memory card, do not touch the other sections of the unit.</b></p> <p>Touching the other sections of the unit may result in electric shock.</p> |
|-------|---|

When a trip error occurs, do the following:

**[Procedure]**

Trip error occurs; UPS stops operating

- ↓
- (1) Open the front door on the UPS graphic display panel (see Figure 5.1 on page 11).
- ↓
- (2) Remove the memory card from the back of the door.  
(Verify that the memory card write LED shown in Figure 9.10 goes out.)
- ↓
- (3) Insert a new memory card.
- ↓
- (4) Close the door.
- ↓
- (5) Give the memory cards that you have removed to the serviceman.



**Table 9.10 Functions of the Memory Card Unit**

|   | Name                            | Description  |
|---|---------------------------------|--|
| ① | Memory card                     | Records failure data and waveforms.<br>This memory card can record the data for four events.   |
| ② | Memory card eject button        | Pressing this button ejects the memory card.*  |
| ③ | Memory card write LED           | Lights when data is being written o the memory card.*  |
| ④ | Power LED                       | Lights when power is applied to the waveform recording system from the operation power supply.<br>(This LED will always be lit when the UPS is operating.) |
| ⑤ | Memory card manual write switch | Used to write arbitrary data to the memory card.**   |


**Notes:**

\* Do not remove the memory card when the LED ③ is lit.

\*\* The switch ⑤ is used when adjusting the UPS and should only be used by a Toshiba serviceman or by maintenance personnel. This switch is not used during normal operation.

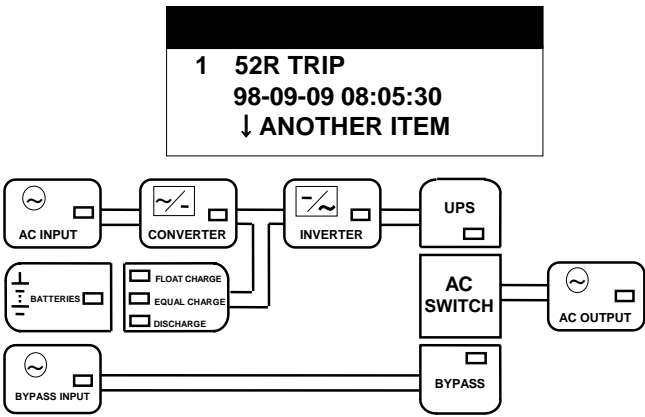
**Figure 9.10 Memory Card Unit**

## 9.4 Restoring UPS Operation

|  |   |
|--|---|
|  <b>WARNING</b> | <p><b>Contact the Toshiba Service Center in the event of malfunction or failure.</b></p> <p>This unit should be repaired only by authorized Toshiba service personnel. Servicing by untrained personnel may increase the scale of the failure or result in electric shock or injury.</p> <p><b>Do not attempt to modify or move the unit yourself or to have this done by a third party.</b></p> <p>Electric shock, injury or failure may result if persons other than specially trained Toshiba technicians attempt to modify or move the unit. Be sure to contact Toshiba if you wish modifications to be made or if you wish to move the unit.</p> <p><b>Only open the front panel when performing necessary operations.*</b></p> <p>Operating parts and high-voltage areas inside the UPS have been provided with covers as a safety precaution. Still, touching areas other than those that must be touched to perform necessary operations may result in electric shock, burns or other injuries.</p> <p>* In this case, "necessary operations" means operating circuit breakers/auxiliary switches and inserting/removing memory cards.</p> <p><b>Do not open the rear door.</b></p> <p>The parts inside carry high voltage. Touching them may result in electric shock, burns or failure.</p> |
|--|---|

This section describes the procedure used to restore UPS operation. Table 9.11 shows an example in which the UPS is restored after a trip error has occurred on circuit breaker 52R with the message "52R TRIP."

**Table 9.11 Restoring UPS Operation (Example)**

| Step | Procedure  | LCD/LED Status (After Execution)   |
|------|--|--|
| 1    | Check the LCD screen.<br>Also check for other Failure Data screens by scrolling with scroll keys ⑦ and ⑧ on the panel. |  |
| 2    | Turn 6CH OFF.  |  |
| 3    | Remove the memory card in the panel and insert a new memory card.*   |  |
| 4    | Contact the Toshiba Service Center.  |  |

In the case of other failures as well, restore by doing the following:

- (1) Check the nature of the failure on the LCD screen.
- (2) Contact the Toshiba Service Center.
- (3) Follow the directions given by Service Center personnel.

**Note:**

- \* Before removing the memory card, always verify that the memory card write LED shown in figure 9.10 is not lit.